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CONTENTS

	PAGE
Editorial Notes	641
The late John Bell	643
Revised North-East London Services	644
The Rheingold	644
Future Developments in A.C. Rolling Stock ...	645
Forty Weeks Railway Traffics	646
Letters to the Editor	646
The Scrap Heap	647
Overseas Railway Affairs	648
Publications Received	649
Diesel-Hydraulic 250-ton Breakdown Crane ...	650
Standard German Passenger Bogie	652
British Railways Channel Islands Ship	655
Boiler Treatment in U.S.S.R.	656
Personal	657
New Equipment and Processes	660
News Articles	662
Contracts and Tenders	665
Notes and News	666
Railway Stock Market and Official Notices ...	668

No Orchids for the Ministry

RECENT debate in the Commons would seem to indicate that the Minister of Transport, Mr. Ernest Marples, has a split mind when it comes to expenditure on rail and road. He has taken every opportunity to stress the vast sums which are being authorised and spent on road construction. Indeed, he appears to take a pride in the size of the figures and the magnitude of the operations on which the Local Authorities as his agents have embarked and are being encouraged to put in hand. He also has made it clear that he is projecting his ideas forward over a number of years and that his Ministry apparently fully expects the need to shoulder a very great burden of expenditure without undue qualms as to how it will be met. In answer to a question in the House last July on how his views on road expenditure agreed with those of the Chancellor of the Exchequer, who had decreed that public expenditure would not be increased, Mr. Marples tartly replied that, so far as he was concerned, funds had been authorised and were going to be spent. All this seems in striking contrast with his attitude to railway expenditure. Not only is the ministerial grip apparently to be tightened here, but no compunction is noticeable in the trimming-down of the modernisation programme or in making it difficult for the railways to plan on the basis of knowing what money will be available at specific times. Recently, Mr. John Hay, the Minister's Joint Parliamentary Secretary, announced that the £160 million estimated as the cost of the London Midland electrification scheme was eight times that of the M.1. This is hardly a fair comparison, for the electrification covers 538 route-miles, whereas the M.1, together with its two arms, covers a mere 72. Also, if £160 million is divided by 538, the result—i.e., cost per route-mile of electrification, is approximately £297,397. In a written reply to an anxious query in the House as to whether, before building any more motorways at about £1 million cost per mile, Mr. Marples would consider a cheaper form of construction, the Minister gave a reassurance that " the motorways so far built have cost between £250,000 and £500,000 per mile." Bearing in mind the mass of ancillary equipment included in electrification but not required by motorways, the high financial return expected from electrification against the mere threat of tolls for motorways, and the disparity in numbers of fatal accidents on electrified lines and motorways, any comparison such as Mr. Hay makes seems rather feeble. In fact, the general attitude of the Ministry toward the railways of this country can justly be described by that word, and this is a disgraceful state of affairs, particularly during the present plight of the railways of this country, when it is remembered that the full title of that Ministry is the Ministry of Transport. We do not ask for a Ministry of Railways—an organisation which exists in many other civilised countries—but we have a right to expect that a so-called Ministry of Transport does not openly favour one aspect of its responsibilities.

We are *not* Amused

AN astonishing example of thoughtless levity was published last week by *The Times* in its Fourth Leader of November 25. This implicitly encouraged its readers to get out and walk if the train in which they travelled were to stop on the line for an inconvenient length of time. A spokesman for British Railways was reported as having reprimanded passengers for having dared to do this, and *The Times* added in comment: " This is the last straw that breaks the back of our patience." If the general public were to follow this leader, it is improbable that backs of patience alone would be broken. To alight on the track from a train, particularly at night, is a completely irresponsible action by which an individual places not only his own life but, by example, the lives of others in serious jeopardy, quite apart from the inconvenience caused to thousands of other travellers by bringing all railway movement in the area to a standstill. *The Times* should have thought before indulging in humour on a matter of this kind.

Channel Islands Service Improved

PASSENGERS travelling to the Channel Islands by sea will, from today, be able to sample the type of service which will become standard next May. British Railways, Southern Region, new 4,174-ton ship *Caesarea* enters public service today as a replacement ship on the present services. For the new services in May it will be joined by its sister ship *Sarnia*, and *St. Patrick*, a post-war vessel now to be extensively refitted and brought up to the same standard of comfort. The *Caesarea* is the biggest ship ever built for the Channel Islands routes, and the largest which can be handled at St. Helier, Jersey. The South Eastern Area Transport Users' Consultative Committee has agreed that the Channel Island passenger services be based entirely on Weymouth from next Spring. By using three modern and economical ships on this short route the Southern Region expects to save over £200,000 a year on the Channel Islands passenger services and at the same time raise the standard of comfort.

International Railway Congress Association

THE present year is the 75th anniversary of the formation of the International Railway Congress Association, and, to mark the occasion, a brochure has been produced giving portraits of the 80 members of the Permanent Commission. The Association was established in 1885 on the initiative of the Belgian Government, on the occasion of the Belgian railway

jubilee, and its permanent secretariat has always been located at Brussels. Its object is to facilitate the progress and development of railways by holding periodical congresses and by means of publications. Congresses have been held on 17 occasions, the most recent of which was at Madrid in 1958. London has been the venue three times, namely in 1895, 1925 and 1954. About 150 railways in all parts of the world, with a total length of some 374,000 miles are affiliated. The subjects considered embrace a wide field dealing with every phase of railway management, operation, engineering, finance, and law. Matters discussed at the congresses may yield recommendations, but these are left to Governments and railway administrations for consideration or adoption, and no conventions or binding agreements of any sort are made.

Overseas Railway Traffics

THE approximate gross earnings of the Indian railways for September, 1960, showed an increase of 14·2 per cent as compared with the approximates for September, 1959. During the month the number of wagons loaded with goods traffic increased by 7·23 per cent on the broad gauge and by 5·27 per cent on the metre gauge as compared with September, 1959. Salvador Railway Company receipts for September amounted to colones 106,000 compared with colones 160,000, a decrease of colones 54,000. Costa Rica Railway receipts for October, 1960, amounted to colones 2,099,772 compared with colones 1,940,736, an increase of colones 159,036. Aggregate receipts from July 1 amounted to colones 9,228,635 compared with colones 8,467,198 for the corresponding period of 1959. Paraguay Central Railway receipts continue to decline. At October 28 the aggregate receipts from the beginning of the financial year amounted to G29,263,849, a decrease of G4,472,972 compared with the corresponding period of 1959. Figures received from the Midland Railway Co. of Western Australia Ltd. show that estimated railway and road service receipts amounted to £A95,097 in August compared with £A76,673 in August last year.

Railway Conference in Tokyo

THE principal subjects discussed at the second Asia, Middle, and Near East Railway Conference, held recently in Tokyo, were modernisation of railways, and co-operation with other forms of transport. Delegates from Egypt, Saudi Arabia, India, Burma, Thailand, Malaya, Indonesia, Philippines, China, Korea, and Japan attended the conference. The principal guest was Mr. M. S. Ahmad, Director of Transport & Communications of E.C.A.F.E. Visits were made to many Japanese National Railways installations and the works of locomotive manufacturers and allied industries. The J.N.R. took this opportunity to demonstrate to an international gathering the progress made with Japanese rolling stock construction. With exports to a potentially rich market in mind, travel was made in luxury multiple-unit trains; the electric "Kodama" and the diesel "Hatsukari." The new "Hatsukari" has not yet been put into regular service, but the "Kodama" has already impressed in service between Tokyo and Osaka. The third session of the conference will be held in India next year. Hereafter it will be staged every two years.

Breakdown Cranes for Canada

THE diesel-hydraulic railway breakdown cranes designed and built by Cowans, Sheldon & Co. Ltd., and described on pages 650-51, are the only major items of equipment ordered outside North America for a very large mining project of Quebec Province. Delivery of the 250-ton machine, equal in capacity to any crane yet built, has been constructed within nine months of receipt of the order. This will be followed in March, 1961, by a 150-ton machine of similar design. The use of a Twin Disc hydraulic torque converter on the Rolls-Royce power unit ensures that the engine cannot be stalled and provides an automatic increase in lifting speed on part loads. Special provision has been made for engine starting at sub-zero temperatures and for operation in ambient temperatures as low as minus 60°F. This has been made possible largely by the use of a diesel-railcar type Smiths combustion heater for pre-heating the engine compartment and for defrosting the main equipment. The cranes will operate on the 190-mile line being built from the iron-ore mines at Lac Jeannine to the St. Lawrence estuary.

The Engineers' Guild

MORE than 600 new members have been elected to the Engineers' Guild during the year ending on September 30, 1960, representing a net increase of eight per cent in the total membership. This encouraging fact is revealed in the recent report of the General Council on the year's activities of the Guild, which has, as one of its primary objects, the improvement in the status, conditions of employment, and remuneration of professional engineers. The recent survey, carried out by the Guild in conjunction with the Royal Commission on Doctors' & Dentists' Remuneration, demonstrated the relatively low status of engineering among the professions. In the year 1955-56, out of 15 professional groups considered, the engineers occupied the last but one place in terms of career earnings. Among the Guild's current activities are their efforts to secure for engineers in the Nigerian Railway Corporation the same treatment as that accorded to their colleagues in Government departments. The improvement in the position of professional engineers in the British Transport Commission, particularly in respect of the remuneration of senior professional engineering staff, is also engaging the attention of the Guild.

The New Erie-Lackawanna Railroad

UNDER the stress of falling revenues two more U.S.A. railways are stated to be amalgamating: the Erie Railroad and the Delaware, Lackawanna & Western Railroad. The boards of these two undertakings, meeting separately, agreed to accept the Interstate Commerce Commission order approving the merger. The new undertaking is known as the Erie-Lackawanna Railroad Company, and its system comprises 3,119 route-miles of line. The net capital investment of the Erie Railroad was some $380,000,000 and its operating revenue about $152,750,000. Its main line connects New Jersey with Chicago and branches serve Buffalo, Cleveland, and other cities. The former Lackawanna system, though only 918 route-miles, in extent, has dense traffic in the New York suburban area, where 67 miles are electrified. Its capital investment figure is $282,000,000 and its operating revenue $76,000,000. Lackawanna lines connect Hoboken, on the New Jersey bank of the Hudson River, with Newark, Paterson, Scranton, Binghamton and Buffalo; the principal branches serve Northumberland, Utica and Oswego.

Progress through Collaboration

A GOOD example of the way in which collaboration between a railway system and a local authority can not only speed up construction work but produce an improved result is provided at Lamesley, near Gateshead. Here, the North Eastern Region of British Railways is working on a mechanised marshalling yard for Tyneside. The four-track Newcastle-Durham main line and the River Team have been diverted east and west respectively of their original alignments to clear the site for the construction of sidings. Meanwhile, Durham County Council has built two road bridges over the river and has replaced two roads. On its original alignment, one of these would have passed under the main sorting yard in a long tunnel: realigned, it is crossed by the railway tracks carried on five bridges. After consultation with the County Council, these were designed with three spans each with the carriageway through the centre span. The two side spans give good visibility along the road and natural lighting under the bridge. The bridges were built by the Dowsett Engineering Construction Co. Ltd. and the Mitchell Construction Co. Ltd.

Mine Spoil for Filling

A TOTAL of 1¼ million tons of earth filling is required for the new yard at Lamesley. Until now, most of the material has been railed some 20 miles from a cutting under excavation. When this is complete, filling will be brought from three colliery waste tips and another cutting (at Newton Hall, near Pity Me). Under arrangements with the County Council, the roads serving these sources of supply will be strengthened where

necessary. Besides providing cheap filling, the removal of spoil from unsightly tips will greatly improve the countryside and, in one case, was actually recommended by the County Planning Officer. As a fire precaution, the waste will be used in layers alternately with the earth from Newton Hall cutting. This cutting is being made to allow improved alignment to be carried out which in turn will permit faster running of trains. The mine waste will begin to arrive at Lamesley in December. It will be transported to the site by Derek Crouch (Contractors) Limited, under the direction of the Chief Civil Engineer of the North Eastern Region of British Railways.

Freight Traffic in the N.E. Region

FIGURES recently announced by British Railways, North Eastern Region, reveal that in the 10 months January to October of this year more than 46,000,000 tons of freight have been carried, 3,500,000 more than in the same period last year. The major industries of the North East, coal and steel, have been responsible for a good part of this improvement, some of which is undoubtedly due to increased production. Production of steel during October has risen by approximately 14 per cent over October last year, but North East rail carryings during the same period have gone up by 16½ per cent, indicating that the railways are increasing their share of the available traffic. The same trend is seen in the coal industry. Figures available for coal class traffic show that in the six weeks ended October 23, the coal and coke available for transport in the Northumberland and Durham Divisions of the National Coal Board, divisions wholly served by the North Eastern Region of British Railways, increased by 2·1 per cent. Carryings by railway increased by 8·1 per cent.

Improved Commuter Services in Philadelphia

IN connection with the rebuilding of Philadelphia, rapid transport of commuter passengers is playing a leading part. The Philadelphia Passenger Service Improvement Corporation formed last winter as a non-profit organisation consists of the City Authority, the Pennsylvania and the Reading Railroads, and 23 railway unions. With the aid of Federal and State contributions it hopes to spend about £10,700,000 on the electrification of all lines in the city, station modernisation and re-location, car parking facilities, improvement of rolling stock, more frequent services, conversion of overhead to underground lines and stabilisation of fares. The two railways are or are to be integrated as a single system within the city. Already improved services and reduction of fares by 40 per cent—including rail-and-bus or tram services—have increased patronage by 36 per cent within 12 months. In one direction an 11-mile Reading Railroad line by improved services has halved travel time and carried 260 per cent more passengers than a year earlier. These improvements are an encouraging basis for those further envisaged.

The Late John Bell

JOHN BELL, whose death is recorded in this issue, liked to be known as plain " Mr." though he was for four years a war-time Brigadier. This was typical of his unassuming character, though he had a remarkable military as well as civil career. A true Scot born and brought up north of the Tweed, he was well known not only in India, but also in widespread Royal Engineer and other military circles and was well loved by his closest friends.

His career began with a five-year's premium apprenticeship at Crewe Locomotive Works, during which time he evidently studied the theory of civil as well as mechanical engineering, as he then passed the A.M.I.C.E. examination; it ended as a Brigadier in command of engineer troops bridge-building the way for 21st Army Group into Germany.

It was also typical of John that though he had retired from India as the General Manager of one of the leading railways and had served with distinction and experience in the First World War, he rejoined the army as a 2nd Lieutenant in 1940. However, by the end of that year he had been promoted Colonel. He served first in the Middle East and was wounded in North Africa, where he was promoted Brigadier in 1941 and was awarded the C.B.E. in the following year. Subsequently, he served under Montgomery on the advance from Normandy to the Rhine, being mentioned in despatches in 1945. In 1946 he was made a Commander of the Order of Leopold II with Palm, and a Knight Commander of the Order of Orange-Nassau with Swords, and was awarded the Croix de Guerre (1940) with Palm. In fact, though only his family and closest friends knew it, he had no fewer than 14 decorations and medals, no mean distinction for a civilian war-time soldier.

He was undoubtedly an outstanding engineer, particularly in military bridge building and was a wizard in improvisation, often producing apparently from nowhere and using most unlikely materials for his bridges, notably those over the Euphrates in 1917-18. Bell had keen foresight, a wonderfully quick mind and unobstructable push and forcefulness, sometimes in the face of long odds, as was the case at the Rhine.

There in virtually front-line conditions permitting of only four days' reconnaissance and preparation, and despite most difficult weather conditions, often including gale-force winds, the 2,368-ft. long Victory Bridge at Spyck was constructed between the driving of the first pile by the Q.M.G. on April 10, and its opening on May 9, 1945. It entailed 1,500,000 cu. ft. of earthwork in the approaches, six 35-ft. approach spans and 27 deck-type 75-ft. and a four-girder through-truss 105-ft. span, subsequently converted to a lifting span. In all, the erection of 1,200 tons of steelwork was involved in the superstructure. It was carried on 27 piers composed of standard military trestling supported by no fewer than 457 60-ft. piles and six other piers on raft foundations. As many as six floating pile-drivers were in use at a time and the girders were launched as cantilevers. The preparations and programming for and supervision and completion of all this work in such difficult conditions and in so short a time required an outstanding personality such as Bell possessed.

In fact, this was a worthy final work credited to him, but it must be realised that it was made possible by the thorough preparatory training of his troops at the Railway Bridge School at Kings Newton, Derby, and on service under him and other able officers.

Now this unique career has ended in a sudden death such as John himself would have wished. His loss will be deeply felt by his many friends, and his cheerful chairmanship at East Indian and other railway dinners will be greatly missed. We extend to his wife, daughter and other relations our deep sympathy.

Revised North-East London Services

ONE of the results of the inauguration of the North-East London Electrification scheme is that only 5 per cent of the passenger train mileage on the Great Eastern line, British Railways, Eastern Region, remains under steam operation. A completely new timetable (reviewed editorially last week) has been introduced for the electrified routes, and because the Cambridge main-line trains and the electric trains work over a common route for much of the distance to Bishops Stortford, a revision of the main-line services became necessary. The opportunity was therefore taken of evolving much-needed improvements in the main-line service in various ways. The service is now operated on a 2-hr. regular-interval basis, with standard departure times from both Liverpool Street and Cambridge. Furthermore, it is planned in such a way that, should electrification be eventually extended to Cambridge, a drastic revision of train service would not again be necessary for the changeover from diesel to electric traction. Another important feature, which will be of benefit to passengers and operating staff alike, is the introduction of standard coach formations on all main-line locomotive-hauled trains, not only on normal services but for peak-hour and week-end traffic as well. The service is also arranged to give balanced workings so that better use is made of equipment and train crews, improved terminal turn-round arrangements are obtained, and a reduction in empty stock working is made possible. Diesel railcars serve the intermediate stations between Bishops Stortford and Cambridge, and a fast diesel multiple-unit service is run during peak periods at 20-min. intervals between Bishops Stortford and Liverpool Street as a relief for the Cambridge trains. The effects of the revised Cambridge main-line service are felt as far afield as March, Wisbech, Kings Lynn, and Norwich, to which the services from Ely have been adjusted to make suitable connections with the main-line trains, and to produce better cross-country connections between these places. The

branch services radiating from Cambridge are also included in the revised scheme.

The electric services consist of two groups, the outer suburban service to Bishops Stortford and Hertford (East), and the inner suburban service to Enfield and Chingford. The former is operated by trains comprising two four-car units between Liverpool Street and Broxbourne, where they are divided or joined to provide four-car trains to and from Bishops Stortford and Hertford (East). A half-hourly service with standard departure times is maintained, increased to three trains an hour during peak periods. Normally, the trains run non-stop between Liverpool Street and Lower Edmonton and then serve all remaining stations, running *via* the re-opened Southbury loop.

The Enfield and Chingford services are operated by three-car units, up to three of which may be coupled in multiple to form nine-car trains. The nine-car formation is used on the Chingford line during peak periods, but for the present a six-car formation suffices for the Enfield peak services. The normal hourly frequency on the Chingford line is six trains, with regular departure times; this number is increased to nine during peak periods. The frequency for the Enfield line is six trains per hour throughout the day, also with regular departure times.

It is interesting to observe how diesel multiple-unit services have been fitted in to complete the pattern of the suburban scheme. On the Lea Valley line, which is not yet electrified and which carries the Cambridge main-line traffic, an hourly service of diesel multiple-unit trains has been introduced between Liverpool Street and Cheshunt, increased to a 20-min. service and extended to Broxbourne during peak periods. A 2-hr. service between Stratford and Cheshunt is also operated over this route by diesel multiple-unit trains, increased to a 40-min. frequency during peak periods. The business service of fast diesel multiple-unit trains between Liverpool Street and Bishops Stortford, referred to earlier, is routed over the Lea Valley line. The steam-operated service between Stratford and North Woolwich, with a peak period extension to Palace Gates, has been adjusted to give regular departure times to facilitate connections with the electric services, and will, in due course, be operated by diesel-electric locomotives. The diesel multiple-unit trains operating the services mentioned above are all formed from three-car units.

The North-East London electrification scheme, together with the revision of services on the Cambridge main line and its associated branch and connecting lines, forms one further stage in the progressive modernisation and rationalisation of all the train services in East Anglia. Steam operation, which now accounts for only five per cent of the passenger train mileage of the Great Eastern line, will be completely eliminated when through electric working is established between Liverpool Street and Clacton and Walton, and the East Anglian diesel locomotive scheme is in full operation. A further step towards the realisation of the latter project will be the introduction of 30 diesel-electric locomotives, of 1,750 h.p., the first of which is expected to be put into traffic very shortly.

Indian Central Railway Developments

THE penultimate year, ended March 31, 1960, of the Indian Second Five-year Plan saw considerable improvement in operating results on the Central Railway over those of its predecessor. Actually, in 1958-59, they had received a slight setback due largely to the temporary inadequacy of electric-locomotive power on the Bombay Division. This was particularly felt in the difficult working of the two serious bottlenecks, the 10- and 16-mile sections with 1 in 37 ruling gradients on the North-eastern and South-eastern main lines up the Western Ghats. It is remarkable that Bombay, city of millions, is cut off from the bulk of India by this 2,000-ft. precipitous barrier, the escarpment of the ghats, that has to be scaled by both Central Railway main lines.

Other contributory handicaps in 1958-59 had been drought and water-shortages, dock labour troubles, a violent monsoon disrupting communications with washaways, and the carrying out of urgent improvement works to increase line-capacity under ever-increasing traffic.

On the other hand, 1959-60 results showed marked improvement in goods-train speeds and in wagon-miles per wagon-day, which on the metre-gauge section attained the record figure of 53·9 miles. The tonnage loaded also materially increased, with the result that during the Second Plan period the loadings rose from 13,400,000 tons in 1955-56 to 18,900,000 in 1959-60 or 41 per cent in four years. Meanwhile, line-capacity has been greatly increased by track-doubling, yard-remodelling and the provision of additional block stations carried out during the full five-year period at a cost of £15,765,000.

This increase is shown by the following table :—

	Number of Trains Each Way Daily	
Section	*Line capacity in 1955-56*	*Planned capacity in 1960-61*
Bhusaval–Itarsi	24·0	31·5
Bhopal–Bina	16·5	24·5 (doubling)
Jhansi–Agra	13·5	16·5
Mathura–Delhi	18·5	34·0 (doubling)
Jubbulpore–Katni	14·5	16·5
Satna–Chheoki	10·0	18·0
Balharshah–Kazipet	8·5	15·5
Kazipet–Vijayawada	8·5	15·0
Dhond–Manmad	9·0	12·0

With regard to the locomotive-power difficulties on the mountain gradients on the Central Railway there were 73 electric locomotives available on the Bombay Division at the end of 1955. Although all trains over both 1 in 37 main-line sections have to be banked in rear, this number was then adequate with the time-honoured importation of precision spare parts to insure satisfactory maintenance. About two years later, under pressure of foreign-exchange difficulties, it was decided to attempt the manufacture of these high-degree precision parts in India. The indigenous parts proved inferior in quality and the difficulties in regard to these replacements were accentuated by the age of the engines for which they were required. Consequently reversion to the importation of the parts was necessary until such time as locally-made ones are more satisfactory.

Meanwhile, five 3,000-V. d.c. locomotives are being transferred from the Eastern Railway to Bombay for modification as 1,500-V. d.c. engines suitable for subsequent service on the Central Railway Bombay Division. In addition, seven new electric locomotives are on order from Japan and 10 from Chittaranjan. The Japanese engines are due for delivery before the end of this year and the first from Chittaranjan should be ready early next year. With these 17 additional electric locomotives the Bombay motive-power position should be greatly improved. They will permit of an increase of the additional trains programmed in the Second Plan period from the 12 already in service to 16. The maximum loads of mail and express passenger trains have been raised from 12 to 13 coaches except on sections worked by electric locomotives, which must await the additional engines.

Bombay suburban electric multiple-unit stock is now to be increased by the manufacture of additional trailer coaches in India, but they will not be in service until 1962-63. A total of 57 coaches, 19 three-coach units, are being transferred from the Eastern to the Western Railway in Bombay for conversion from 3,000 V. to 1,500 V., and the Western Railway will in turn release 32 coaches, eight four-coach sets, for transfer to the Central Railway. When they are available the C.R. suburban services are to be increased materially.

The Rheingold

TO those who knew the Rheingold in the first days, when it comprised five or six Pullman cars, headed south of Köln by a bar-framed four-cylinder compound Bavarian Pacific of Krauss-Maffei build, the stages in those 35 intervening years have been followed not merely with interest but perhaps also with misgivings which are not entirely sentimental. The Bavarian Pacifics gave way to the then new Reidsbahn 01-class engines of the same wheel arrangement about 1928, and subsequently ordinary coaches took the place of the Pullmans. After the war the Rheingold was not resuscitated for several years, and then for a short time comprised prewar stock until the new standard 26-metre Deutsche Bundesbahn coaches were introduced in 1954. Since that time the train consist has been entirely of these coaches, with Minden-Deutz bogies, and with first-class accommodation only, but with a D.S.G. diner and a D.B. van in the formation.

Originating at Hook of Holland, the southbound train today has through coaches for Münich, Chur, and Milan; the coach, which ran through to Rome, now terminates at the last-named city. The Münich coach comes off at Köln and a Dortmund-

Basle coach is added, an electric locomotive put at the head, and the train direction reversed in the course of an eight-minute stop. Re-marshalling at Köln is in reverse for the northbound train. From the Hook of Venlo a Netherlands Railways Bo-Bo or Co-Co electric locomotive and driver go right through, and from Venlo to Köln a D.B. 2–6–2 steam locomotive of class 23 is used; but the V.200 diesel-hydraulic locomotive, which for three or four years formed the motive power south of Köln, has been replaced by an E.10-class Bo-Bo electric locomotive, which runs through from Köln to Basle S.B.B., 320 miles in 316 min. inclusive of 15 min. standing at seven stops. Between Köln and Basle Bad. Bhf., all station stops are limited to one minute except at Mannheim, where two minutes are allowed.

Over the past three years there has been gradual acceleration, in the south-bound direction by earlier arrivals in Basle, and, since June last, by a later departure, 07.00, from the Hook. In the northbound direction, later and later starts from Basle have been the rule, with arrival at the Hook fixed more or less at 23.20 to 23.30, giving the last connection to the Harwich boat, which sails at 23.45. Departure time from Basle is now 14.34 (S.B.B. Station) and 14.43 (Bad. Bhf.), and arrival time at the Hook 23.24. In the reverse direction the Hook is left at 07.00 and Basle reached at 15.30 (Bad. Bhf.) and 15.44 (S.B.B. Station).

Though south of Köln the successive start-to-stop bookings average 59 to 61 m.p.h., there are two in excess of 70 m.p.h., namely, Mannheim to Karlsruhe at 70.6 m.p.h. for the 37.7 miles, and Karlsruhe to Freiburg at 73 m.p.h. for the 84 miles; top permissible speed over these sections is 87 m.p.h. There is also a 65 m.p.h. snippet between Köln and Bonn, 20.6 miles. In the northbound direction, the addition of an odd minute or two results in only one booking over the 70 mark, from Freiburg to Karlsruhe at 72 m.p.h. With the successive accelerations have come increasing discomforts. Good riders though the D.B. 86-ft. standard coaches normally are, the rough passage and high-decibel noise level throughout a 7¾-hr. run from the Hook to Basle, over what is generally first-class main-line track, are tiring in the extreme. Here, at least, the potentialities of electrification in regard to speed have been allowed to nullify the necessary general amenities of railway travel. Experiences on this and certain other fast Continental electrically-hauled trains do not lead English travellers to urge on the day when the long-promised high-speed electric travel on British Railways will be accomplished, particularly in view of the dissatisfaction still being expressed at the standard of passenger-coach bogie design in Britain.

Future Developments in A.C. Rolling Stock

IN our issues of October 21 and November 11, 1960, we reviewed the developments in electric traction engineering which, as revealed at the British Railways Electrification Conference, have been incorporated in the locomotives and multiple-unit trains built for the initial 25-kV. a.c. electrification schemes. To conclude this series of articles it would seem appropriate to examine the further developments which are either in hand or are contemplated for a.c. electric rolling stock. Present plans do not visualise putting any more a.c. electric locomotives into service until 1963 or 1964, and the opportunity is thus presented of judging the performance of the different designs of equipment in service, and of modifying such of the specified requirements as may be considered desirable as the result of the operating and maintenance experience with the first batch of locomotives. The aim is to limit the number of different designs of equipment with the ultimate object of achieving an acceptable standard design, at the same time making provision for the incorporation of still further developments, which are inevitable.

Of the standard items of electrical equipment at present fitted to all locomotives, the pantograph design is being given particular attention with a view to eliminating the need to prevent transverse tilting of the pan. The development of high-tensile plastics may render practicable the adoption of insulated horn tips.

One of the most important questions concerning the locomotive electrical equipment which is being studied is the method of mounting the traction motor. The performance of the frame-mounted motors, their maintenance costs, and their effect on the track, will be compared with those of the axle-hung motors fitted to main line diesel-electric locomotives. Although some time must elapse before a reliable conclusion can be reached, there are already indications that the axle-hung motor with roller suspension bearings will prove to be the final choice, with the consequent elimination of the cost and complication of the frame-mounted type. Attention is being given to improving the layout of the equipment in the locomotive, leading to greater accessibility, but this problem is aggravated by loading gauge limitations. Increasing knowledge of the relationship between wheel diameter, axle load, and rail stress may allow the adoption of the 42-in. wheel, and thus offer greater scope for re-arranging the locomotive equipment. Re-routing of cable runs is deemed to be necessary, and consideration is being given to the method of installing all small wiring and most large cables in racks above the equipment instead of on the floor. The series arrangement of ventilation with its consequent reduction in the number of fans and auxiliaries, already adopted in one make of locomotive, is favoured for more general use in future.

An outstanding development in multiple-unit stock practice is the production already in hand, of a series of high-speed main-line units. These units, arranged both as four-car and two-car sets, will be equipped with silicon rectifiers and are designed for a balancing speed on the level of 90 m.p.h., and an acceleration of 0·8 m.p.h. per sec.

A number of developments in connection with power control are worthy of mention. One of these comprises a low-tension tap-changing scheme for locomotives, using transducers to eliminate arcing at the tap-changing contacts and to permit the possibility of smooth control of traction motor voltage. This arrangement, in conjunction with the use of air-cooled silicon diodes in place of water-cooled ignitrons, will also allow rheostatic brake equipment to be installed without increase in weight. A multiple-unit equipment which is to be introduced consists of air-cooled silicon rectifiers with a stepless tap-changing regulator. The regulating transformer is an auto-transformer with carbon collectors rolling axially along the windings and is immersed in a nitrogen atmosphere. Elimination of notching peaks and a reduction in power loss are among the important features of this system. A further form of notchless control under development relies on rectifier switching during tap-changing to relieve the tapping contactors of arc-rupturing duty. This results in the reduction of wear and maintenance, and dispenses with the need for tap-changing reactors.

With regard to mechanical parts, developments are, in the main, based on the need for reducing maintenance work and costs, the desirability of obtaining the best layout of equipment, and the problem of obtaining the best relationship between weight and cost. In pursuit of the first of these aims, the extended use of rubber to replace metallic rubbing surfaces is probable, as is also the continued use of the steel coil spring, of suitable material and not excessively stressed. Improvement in riding qualities, particularly of multiple-unit stock, is one of the most important subjects receiving attention, and developments are taking place in the direction of producing simplified bogie designs with consequent reduction in maintenance. The same also may be said for the design of the brake system, and, in this connection, developments are continuing toward the production of a satisfactory disc brake.

Reference has already been made to the question of improved layout and better accessibility of equipment, and the attainment of these objectives appears likely to be assisted by developing the design of the initial British Railways-built locomotives. The principle of this design consists of a combined underframe and lower portion of the body forming a trough-sectioned load-carrying assembly, on which is mounted a removable lightweight structure forming the upper portion of the body and the roof. A praiseworthy object is the proposed introduction of a non-trussed underframe for multiple-unit motor coaches. The decision to use the standard centre-girder underframe for the initial series of multiple-unit trains unfortunately imposed severe restrictions on the design and layout of the underframe equipment, and it is a step in the right direction that the design of the mechanical parts should be closely related to that of the equipment they have to carry to produce a satisfactory combined assembly. It is of interest to recall the arrangement of the motor-coaches of the Southern Region express multiple-unit stock built for the Brighton electrification some 30 yr. ago, in which the use of a non-trussed underframe

greatly facilitated the layout of the equipment mounted thereon.

A considerable amount of investigation is in progress towards the production of economical forms of construction for both locomotives and coaching stock. Although many new materials and processes have become available, in many cases their adoption with the object of weight-saving would not, because of their cost, be economically justifiable. But development is proceeding in the use of steel-reinforced plastic materials for coach construction, which may, in the end, result in a substantial saving in weight of some 10 to 12 tons per vehicle. Weight-reduction on locomotives and motor coaches is bound up with the problem of adhesion, a subject to which a considerable amount of research is being devoted.

Another noteworthy development concerns the electro-diesel locomotives, the advent of which on the Southern Region d.c. third-rail system is awaited with interest. The principal feature of this type of locomotive is the fitting of a straight electric equipment together with a diesel engine of medium power. The latter enables the locomotive to operate as a diesel-electric on non-electrified lines and on electrified tracks on which the power supply to the conductor rail has been cut off for track maintenance purposes. Consideration is being given to 25-kV. a.c. locomotives built on this principle, incorporating a diesel-electric equipment to permit operation on non-electrified tracks and sidings.

In conclusion, it appears that, of the many developments which are in hand or are possible, those which are likely to have the most far-reaching effects on future design consist of the solution of the adhesion problem, the development of structural plastics, the elimination of moving parts from the control gear, and the simplification of the cabling system.

Forty Weeks Railway Traffics

(By a correspondent)

IN February the British Transport Commission submitted to the Select Committee on Nationalised Industries a memorandum on the commercial outlook for British Railways. The paper said that, in an expanding transport market, the problem for our railways was " to carry a certain proportion, and only a certain proportion, of the traffics of the future." The Commission thought that any further decline in coal carryings could only be gradual, and meanwhile increases were forecast in steel and other heavy traffics and a continuation of the rising trend in lighter traffics would restore much of the tonnage lost in recent years.

Number 10 *Transport Statistics* shows that in 40 weeks of this year to October 9, the railways originated 12,462,000 more tons of freight traffic than in the year 1959, an increase of 7 per cent. Merchandise and live stock tonnage was up 2,374,000 (8·5 per cent), minerals accounted for 7,056,000 more tons (18 per cent), and coal class traffic was 3,033,000 tons, or almost 3 per cent larger. These advances on the poorest year for freight business since 1933 do not count for a great deal. Compared with 40 weeks of 1953 merchandise was down 7,051,000 tons (18 per cent), minerals 3,402,000 tons (7 per cent), and coal 20,378,000 tons (15 per cent)—an aggregate loss of over 30 million tons, or 16 per cent.

To move the 1960 traffic the railways worked 806 million more ton miles than in 1959, an increase of 6 per cent. The total ton mileage of 14,058 million was 3,136 million, or 18 per cent, less than the volume of freight movement in 40 weeks of 1953. Yet in November the National Coal Board had to relieve the railways by sending large quantities of coal to power stations by road! That is retrograding for the larger the traffic volume, the better are the prospects for the success of railway operations. Mr. E. J. Hill, chairman of the U.S.A. Eastern Railroads Traffic Committee, emphasised that principle recently in the following terms: " the important goal is for the railroads to make their volume at least match the trend line of increase in the production of each commodity."

Over 40 weeks, merchandise furnished only £2,326,000, or 3 per cent, additional revenue. Mineral receipts were £4,141,000 or 12 per cent higher, but coal receipts were lower by £1,259,000 or 1·5 per cent. The total increase of £5,208,000, or 2·7 per cent, in freight train revenue will not go far to meet the upsurge in working costs. In contrast passenger takings for 8 months to August were £7,462,000, or 7·6 per cent higher and parcels receipts for 40 weeks were £1,632,000, or 3·9 per cent, up on last year.

The volume of passenger travel dropped by over 3 per cent to the end of August, the number of journeys decreasing by 24,054,000 million. All Regions had fewer bookings. The London Midland lost 6,569,000, or 4 per cent of last year's passengers, and the Western 5,988,000, or 8·4 per cent. Though the Southern originated 4,045,000 fewer journeys, a loss of 1·4 per cent, the decrease in season ticket journeys was merely 496,000, or 0·4 per cent. The Eastern had 433,000 more season ticket journeys, an increase of 1 per cent, but large decreases in journeys at full fare and early morning tickets reduced its total carryings by 3,429,000, or 3 per cent. The decrease per cent in first class travel was higher than in second class, except in the Western Region which issued 31 more first class tickets. On an average a first class passenger paid 2s. 5d. more for a journey and a second class passenger 3s. 3d. The further rise in fares which the Commission contemplates may result in another diminution in rail travel, despite the lavish expenditure on passenger services in recent years.

Letters to the Editor

(The Editor is not responsible for opinions of correspondents)

Pullman Services

November 25

SIR,—In reply to the letter from Mr. C. J. Dadswell, published in your issue of November 25, I can assure him that I have ridden over Commonwealth bogies, and agree that the ride is much more comfortable than those given by British Railways standard and all other bogie designs in common use on British Railways. Unfortunately, I have yet to experience a worn Commonwealth bogie on bad track, the supreme test. At best, the Commonwealth bogie gives as good a ride, but no better, than at least four much lighter types of Continental bogies, over which I have travelled many times on all sorts and conditions of track.

The question is thus one of both first cost and maintenance, not only of the bogies themselves (including brake blocks) but of the vehicles as a whole and of the track. Train performance, too, has its economic aspect. The inferiority of the Commonwealth bogie, in my opinion, is thus largely an economic one, arising from its weight. It may well be the best solution for underdeveloped countries with only unskilled labour and poor maintenance facilities, but not for European conditions where railway vehicles should be correctly treated as valuable and refined engineering products.

Personally, I consider the S.I.G. torsion bar bogie to be the best design yet, performing well even on second-rate track in conditions where maintenance was obviously only infrequently carried out. The Schlieren and Minden-Deutz, to name two other light bogies, are also good, in main-line service, but are less widely applied in poorer conditions than the S.I.G., so cannot be completely compared with it. The S.N.C.F. Y. 20 B., with some features similar to the Commonwealth design, is disappointing in my experience, being rough on tracks on which the Swiss stock rides well.

Yours faithfully,

JOHN RODGERS

132, Worrin Road, Shenfield, Essex

Prague Termini

November 23

SIR,—I was interested to read in your issue of November 11 of the pending alterations at Prague, but was puzzled by your reference to the " other two termini." Tesnov Station is a minor terminus for suburban traffic only, and of the three major stations only Stred is a terminus, Hlavni and Smichov being through stations.

Yours faithfully,

498·1

Chiswick, W.4

THE SCRAP HEAP

Fireman's Dinner

Something hit the front of a Liverpool Street-Norwich train as it sped through Norfolk. At the next stop, Spooner Row, the fireman found a dead pheasant on the locomotive. He had it for dinner. "It was excellent," he said.—*From the "Daily Express."*

Engine Induction?

Mr. F. Smith, a railway employee who lives at Doncaster, has invented an artificial-respiration practice machine intended to be used for live-saving instruction. The device was constructed of spare parts from railway coaches and locomotives and the total cost was only £30. Seven of the machines have been ordered by British Railways, and the National Coal Board is reported to be interested also. —*From "The Guardian."*

A Short Life

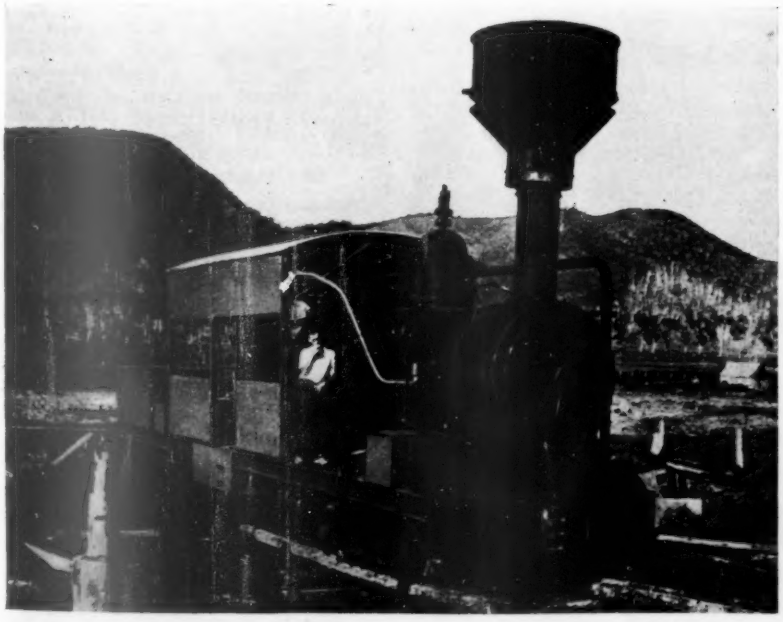
In 1919 R. Tulloch & Company (now Tulloch Limited) of Rhodes, Australia, which was constructing goods wagons with hardboard flooring, decided to cut and mill its own timber. Operations began at Mount George, and a "bush-tramway" consisting of wood rails with a 4-ft. 8½-in. gauge was laid for the carriage of logs. A specially constructed locomotive proved too light for the work, and another was adapted from a "Climax" geared logging engine. Modifications were made for the use of a boiler from an "F" Class 2-4-0 tank locomotive and a vertical twin-cylindered marine steam engine previously used in a tugboat. The engine, when assembled on the locomotive framing, was mounted at the rear of the boiler firebox. A large steel gearwheel, keyed to the projecting end of the engine crankshaft, engaged a pinion attached to the shaft leading to a gearbox. Below the framing and driven by the gearbox wheels was a shaft which turned the geared bogie wheels at each end of the locomotive. Sliding and universal jointing was incorporated for flexibility. Each axle was fitted with hypoid bevel gearing to engage the longitudinal drive shaft. After trials the locomotive made a run over the bush track at Mount George, which broke under its weight. A new and stronger track was laid, but also proved too weak. Eventually the locomotive was dismembered and replaced by petrol-engine traction.

Record in Miniature

Recently a Hornby-Dublo (Meccano Limited) standard model of the Western Region *Cardiff Castle*, hauling six coaches to simulate the "Red Dragon" express, set up a scale track speed of 123 m.p.h. During continuous running for 96 hr. under a sealed plate-glass cover the train completed 46,000 circuits of the 6 ft. x 4 ft. 00 gauge oval track, thus covering an actual distance of 153 miles and a scale distance of 11,000 miles. The model was powered by a Ringfield electric motor incorporating an Alcomax ring magnet which, it is claimed, ensures permanent strength throughout the motor and provides a constant air-gap which is maintained within very fine limits. High quality brushes designed to last for 200 hr. were also used.

Sea Shell Ballast

The tribulations of the engineer engaged on the construction of the Demerara East Coast line, in British Guiana, between 1846 and 1900, ranged from conflicting directions through stoppages for lack of funds to construction of an embankment of light ballast consisting mainly of crushed sea shell. It is recorded that 50 years after the first section was laid and in operation, a sample of shell ballast was sent, tongue in cheek, to a high authority for opinion as to suitability. The report which followed was brusque and somewhat impatient, its terms being, "You should know better, the stuff is useless for railway ballast and to use it would be disastrous." Nevertheless, it was used and still is; the bed of the track is beaten hard on it by over a century of running on the first section and over half a century on the remainder.



Locomotive adapted from a "Climax" geared logging engine with "F" Class 2–4–0 tank locomotive boiler and marine steam engine

New Station Celebrated

Chinese stamp depicting the recently-completed Peking Station

Automatic Signalling in 1842

In the early days of the railway, policemen gave the signals and operated the first mechanical systems of signalling. In December, 1842, Charles Berwick Curtis, C.E., of Acton, London, wrote an account of an automatic rail signal fixed on an overhead bridge. "The apparatus consists of a round signal, composed of glass, the upper third part red, and the remainder green, descending into view from a casing of three colours, such as black, green and red in equal divisions. Upon the signal is a white plate, which projects in front of an opening through a slit in the casing; and so that the signal may be used at night as well as by day, a lamp was placed behind the centre casing. A trigger is fixed on the near side of the rail, at a suitable distance, and at a proper height to be cleared by the steps of the carriages . . . (the trigger) is attached to a horizontal shaft revolving on bearings with a counterweight and these are connected by suitable shafts and levers with the signal field. When the engine passes and depresses the trigger, the signal-field is released and falls below the casing; by this means the machinery is set in action and, in a given time which is regulated by clockwork, raises the signal-field up within the casing, indicating, by the coincidence of the coloured compartments of the casing with those of the signal, the length of time which has elapsed since the trigger was depressed."

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Improvements Scheme

Good progress is being made on the improvements programme for South-West Africa which is estimated to cost some £29,000,000. The programme includes improvements to Walvis Bay harbour at a cost of £4,000,000, the widening of the narrow-gauge lines in the territory to standard 3 ft. 6 in. gauge at an estimated cost of £7,300,000, and the conversion to diesel traction of the entire system.

RHODESIA

Improvement in Freight Traffic

Rail traffic from Katanga over the Rhodesia Railways has risen by about 40 per cent since the beginning of July. Traffic to that part of the Congo has fallen slightly but is recovering and in September was only some 6,000 tons less than the January—June monthly average of 35,300 tons. This is despite the fact that a considerable tonnage of Northern Rhodesian copper which had been passing to Lobito has been entirely diverted to Beira and Lourenco Marques, over the Rhodesia Railways, since July. Imports of general goods via Lobito to Northern Rhodesia have fallen to negligible quantities, and only 815 tons were received by this route in August and 803 in September, which represents some 30 to 40 wagons a month. In the 12 months up to June this year a monthly average of 10,500 tons of Katanga copper was routed over the Rhodesia Railways to Beira; in July the figure rose to 13,122, in August to 14,573, and in September it went up to 18,823 tons, but then declined to an estimated 13,000 tons in October.

WESTERN AUSTRALIA

Iron and Steel Manufacture

Broken Hill Pty. Ltd. plans to establish an iron and steel industry in Western Australia at a cost of £A40 million.

Details of the plan were announced recently by Mr. D. Brand, West Australian Premier. It provides for the establishment of an integrated iron and steel industry at Kwinana, about 20 miles south of Perth. Mr. Brand stated that the project would depend on an agreement with the Federal Government for the construction of a standard-gauge railway between the Western Australian centres of Kalgoorlie and Fremantle, a distance of some 350 miles. The railway could cost about £A35 million. He said that the agreement between his Government and Broken Hill Pty. Ltd. stipulated that the line was vital to the economics of the new industry, and that the Federal Government was investigating a plan for a standard-gauge railway put forward by the West Australian Government.

AUSTRALIA

Piggy-back Transport

A number of important service improvements have recently been announced by the Acting Commonwealth Railways Commissioner, Mr. K. A. Smith. First of these is the introduction of piggy-back transport for loaded semi-trailers on the North Australian line between Larrimah and Darwin. This will save road operators considerable expense on this 320-mile haul, will protect the parallel highway from heavy traffic, and will raise the profitability of the line.

Standard Gauge Estimates

The cost of converting the Marree-Alice Springs line to standard gauge and its extension to Tennant Creek has been estimated at £17,000,000. The most economical method would be to use the existing track between Marree and Oodnadatta (247 miles) in conjunction with a third rail. At this point temporary transfer arrangements could be made, the middle rail recovered, and the process repeated between Oodnadatta and Alice Springs (293 miles). The economics of the proposal depend on the extension of the line to Tennant Creek (some 320 miles) as rails to the value of £770,000 would become surplus from the Oodnadatta-Alice Springs section when this becomes standard gauge.

INDIA

Telecommunication Installation

Marconi Wireless & Telegraph Co. Ltd. has received an order from Bharat Electronics of Bangalore for the supply of a v.h.f. multi-channel communication system for the South-Eastern Railway. This is the first order placed by the Indian company since the signing of an agreement for the manufacture of Marconi equipment in India. The equipment to be supplied consists of 16 "HM-100" terminals and eight "HM-150" repeaters with aerials and ancillary gear. It will be used to provide communications over the route connecting Adra, Tatanagar, Chakradharpur, and Garden Reach.

Safe Handling of Explosives

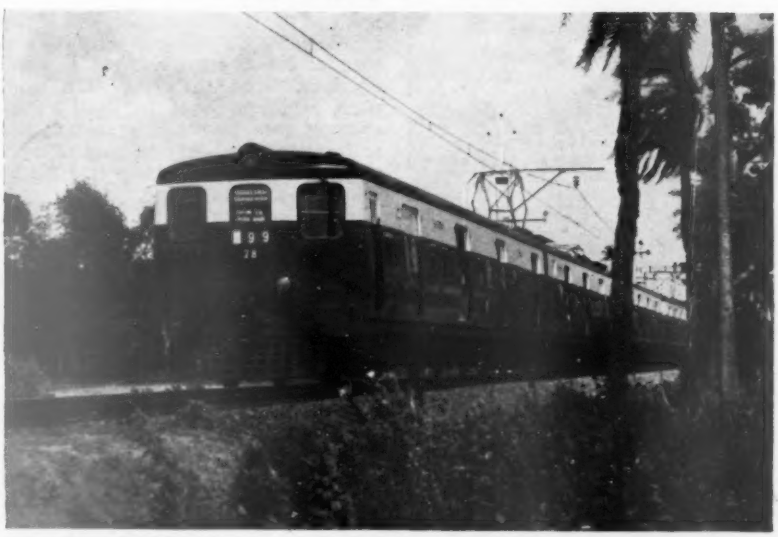
Pictorial labels will in future be displayed on packages and wagons containing explosives and allied dangerous goods during transit by rail. The labels would indicate the hazards involved in handling the contents. This is one of the provisions of the new red tariff which came into force on December 1. Drawn up in consultation with the Chief Inspector of Explosives in the Ministry of Works, Housing & Supply, the new tariff is intended to enable the railways to minimise the dangers involved in the transportation of explosives and other dangerous commodities.

CANADA

Facsimile Service Inaugurated

A high-speed public facsimile service between Toronto and Montreal was inaugurated last month by Canadian

Electric Traction in India



Multiple-unit electric train operating between Tarakeswar and Howrah on the Eastern Railway. The line is electrified at 3,000 V. d.c.

National and Canadian Pacific Communications. The new system, to be known as wirefax, is the first of its kind in Canada, and instantly reproduces an exact copy of typed or hand-written letters, reports, drawings, sketches and documents between the two cities. Wirefax facsimile service is offered on the same basis as the telegram. The material to be copied can be picked up or delivered by messenger. It will also be possible to use the service on a collect basis. As all material is reproduced in its original form at destination, wirefax will provide precise transmission of copy material The new service will also permit the sending of letters and reports in foreign alphabets. Wirefax, operating on a 24-hr. schedule, will accept any copy prepared on paper 9½ in. wide, with the actual material to be transmitted spaced within the machine's scanning area of eight in. width.

Load Transfer Vehicle

The latest method of transferring road trailers to railway flat wagons is now undergoing tests at the Canadian National Railways Montreal Bonaventure freight yard. A straddle carrier, known as a Travelift, can lift a trailer weighing up to 40 tons and complete a transfer from road to flat wagon in less than five min. The carrier is 27 ft. high, 30 ft. wide and completely mobile. It travels on pneumatic-tyred wheels and all movements, including propulsion, power steering, lifting and lateral shifting of the load, are hydraulically operated. Power is supplied by a 65-h.p. petrol engine. The carrier is on loan to the C.N.R. for a three-month trial from the National Steel Car Corporation Limited.

UNITED STATES

German-built Diesels

Two principal railways plan to experiment with German-built diesel locomotives in an effort to reduce maintenance and other costs. Both the Southern Pacific and the Denver & Rio Grande Western Railroad next year will take delivery of three diesel-hydraulic units each from Krauss-Maffei. Officials of the Southern Pacific expect the locomotives to require considerably less maintenance than those at present in use on United States railways, and thus expect to achieve reductions in the cost of operations also.

SWEDEN

C.T.C. Installation

The C.T.C. installation on the single-track line between Kiruna and the Norwegian frontier, the entire length of which runs north of the Arctic Circle, has been commissioned. The line carries very heavy iron-ore traffic from the mines in Kiruna to the Atlantic port of Narvik with, at present, a maximum of 65 trains a day. The ore trains weigh up to 3,100 tons. The line also carries passenger traffic. The C.T.C. office is equipped with a train graph, which is also used as a train journal. The installation is now being extended southwards to Gällivare and will then comprise 22 field stations extended over 144 miles of line. The southern line also will carry principally iron-ore traffic destined for Narvik.

Publications Received

Central Railway (of India) Annual, 1960, Bombay. 130 pp. 10½ in. x 8½ in. Profusely illustrated, partly in colour. Price Rs. 1–50 (2s. 3d.).—To mark the centenary of the birth of the Great Indian Peninsula Railway Journal this, the first, Central Railway Annual has been published. Under a striking coloured cover it contains a wealth of excellent photographic reproductions, some in colour. Following introductory and greetings messages there is an article entitled "Stephenson, the Father of Railways," illustrated by scenes on the Liverpool–Manchester and other contemporary lines. Up-to-date reports on C.R. progress and developments precede about 80 pp. mostly filled with a wealth of scenic, architectural and other illustrations of the Taj Mahal and similar C.R. attractions, of stories and of the Andaman and Nicobar Islands; also some striking portraits and many archeological gems.

Radio and T.V. Selenium Rectifier Stocks.—Bulletin No. SR-2006 of International Rectifier Co. (Great Britain) Ltd. describes the company's range of stock selenium rectifiers from which immediate delivery can be given. These rectifiers are designed to meet the most commonly required outputs, i.e., h.t. supplies for electronic equipment, radio, and television, also l.t. outputs for battery charging and transistor supplies.

Weld-ability.—This 56-page booklet is designed to assist in the production of efficient welds with maximum ease. It is written in a light-hearted manner and the first half deals with the principles of good welding, detailing the necessary equipment and types of welds, explaining terms, symbols, and British Standards. The second part covers English Electric arc-welding electrodes and equipment. The purpose of each is clearly explained and there is a helpful section at the end on welding troubles, their cause and cure. The booklet is produced by the Welding Division of English Electric Co. Ltd., East Lancashire Road, Liverpool, 10.

Hymatic Hydrovane Compressors.—This leaflet published in French and German describes the Hymatic Hydrovane range of mobile air compressors. It features action photographs and a schematic diagram of the Hydrovane unit, with technical information to explain its advantages over piston-type compressors. The leaflet is intended for use by Hymatic distributors in Belgium and Switzerland and to extend sales to other French and German speaking parts of the world.

Incanite—the Special Process Cast Iron.—This single-sheet leaflet, No.IN.2, describes Incanite high-duty iron for press tools. It illustrates press-tool castings weighing 8 ton 2 cwt., and draw tool inserts.

Railway Trackwork.—This leaflet, published by Hadfields Limited, describes the wide range of products supplied to the railways of the world. It is mainly concerned with trackwork, but the large range of castings, forgings and pressings for locomotives and rolling stock is also listed.

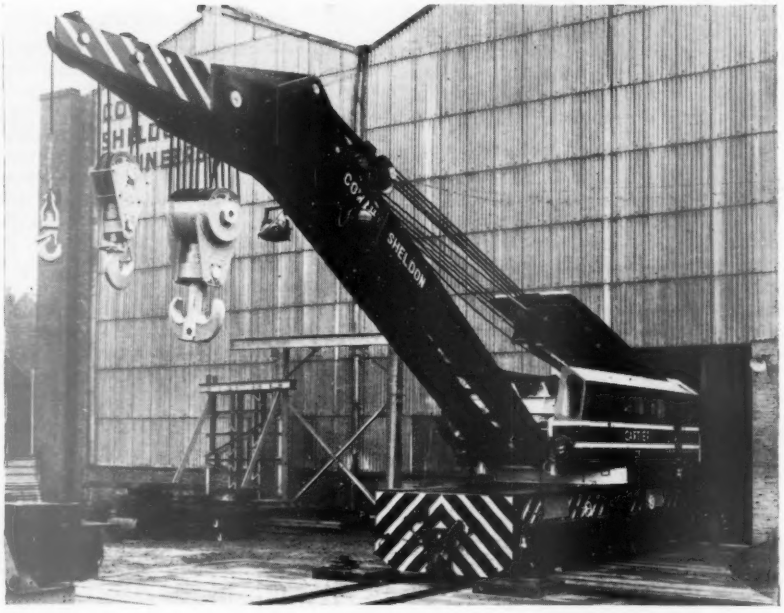
Simmonds Self-Locking Nuts.—A new 48-page technical manual now available from Simmonds Aerocessories Limited, a member of the Firth Cleveland Group, lists the company's comprehensive range of Nyloc and Pinnacle self-locking nuts, together with illustrated introductory features. These deal in general terms with the Simmonds self-locking principle, the costs savings made, the many applications in industry, and the technical performance of Nyloc nuts. The general data sections contain all the dimensional and technical data required by designers, draughtsmen, and others who have to choose and specify the exact type of self-locking nuts for any particular job, together with a reference code enabling the part number, material and finish of any nut to be specified concisely. The manual is available on request from Simmonds Aerocessories Limited, Treforest, Glamorgan, or its London, Birmingham or Manchester Sales Offices.

King Dick Hand Tools.—The eighth edition of the King Dick catalogue of hand tools has recently been published. It contains full details of some 2,000 hand tools, from the smallest ignition, 2 in. long and weighing 1/12 oz. to the King Dick slogging ring spanner nearly 1 in. dia. and weighing up to three-quarters of a hundredweight. The catalogue is printed in two colours and profusely illustrated throughout. It covers hand tools for the automobile, agricultural, aircraft, coal, engineering, electrical, constructional, oil, nuclear energy, refrigeration, and shipping industries.

A Guide to Resins and Glues for Industry.—As a result of the advances which have been made in recent years in the formulation and manufacture of synthetic resins and glues of various types, these materials have today an extremely wide variety of industrial uses, and despite the fact that one particular material may be suitable for a number of different types of work, the variety of uses is such that individual requirements can, in the main, be met only from an extensive range of resins and glues. This booklet lists the various products of Leicester, Lovell & Co. Ltd., and gives brief notes on their application and properties. Copies are available from Leicester, Lovell & Co. Ltd., North Baddesley, Southampton.

Diesel-Hydraulic 250-ton Railway Breakdown Crane

Torque converter transmission and air-operated controls in Rolls-Royce powered machine for Arctic conditions in Canada



Cowans Sheldon 250-ton Crane after testing at works of maker

A 250-TON railway breakdown crane, designed and built by Cowans, Sheldon & Co. Ltd., Carlisle, has been tested and will shortly be shipped to the Quebec Cartier Mining Company in Northern Quebec Province, Canada. This will be used to re-rail locomotives and rolling stock if accidents occur on the 190-mile railway being built to carry iron-ore from the mines at Lac Jeannine to the new port of Port Cartier on the North Shore of the St. Lawrence estuary.

The maximum capacity, which is 250 short tons, is claimed to equal that of any crane in the world. A crane of similar design having a capacity of 150 short tons is under construction for delivery to the same site in March, 1961.

Power for travel and lifting is by diesel-hydraulic equipment. The crane is mounted on a 4-ft. 8½-in. gauge six-axle double-bogie carriage, and is constructed to pass a loading gauge 15 ft. 3 in. x 10 ft. 6 in. wide. Bogie pivot centres are 19 ft. and axle centres 5 ft., giving a minimum radius of curve negotiable of 150 ft. Length over headstocks is 36 ft. 7 in. and over the couplers 40 ft.

The maximum axle-load when in running order, with the jib suspended and blocks carried on a match-truck, is 68,000 lbs. The maximum lifting capacity with outriggers set is 500,000 lb. at 17 ft. 6 in. radius on the main hook. Minimum reserve stability is 17 per cent. An Elliot load cell anchored to the main cable is used to operate the load indicator in the cab. A Taylor & Hubbard cant indicator for use when lifting on super-elevated track is attached to the frame, adjacent to the load/radius charts.

A Rolls-Royce six-cylinder pressure-charged oil engine, rated at 255 b.h.p. at 1,800 r.p.m., provides the power. The crane will lift the maximum load on the main hoist at 5½ ft. per min.; 112,000 lb. at 30 ft. per min. on the auxiliary hoist; and on the whip hoist 28,000 lb. at 130 ft. per min. Lighter loads are lifted at proportionally increased speeds, for example, half load at twice the speed. The full load may be slewed through 360 deg. in two min. and the jib may be derricked-in from running height to minimum radius in two min. Rated loads are derricked from maximum to minimum radius at 15 ft. per min. The crane will travel with a load of 86,000 lb. on the hook up to a 2½ per cent grade at 150 ft. per min., or on the level at 300 ft. per min.

Severe Starting Conditions

The Rolls-Royce C6SFL engine, driving through a Twin Disc torque converter, is arranged for operation in ambient temperatures down to minus 60°F., and for starting at an engine temperature of minus 10°F. The Serck cooling system incorporates the Serck-Behr hydraulic-motor fan drive. The fan speed and operation of the radiator shutters are thermostatically controlled to suit the amount of cooling required. During the summer months a pusher-type fan is used, drawing air from the engine compartment. In winter a puller fan is substituted. Other accessories include 32-V. electric starting equipment, Nife alkaline starter battery, Start Pilot ether starting carburettor, hydraulic emergency starting equipment, and air compressor. The instrumentation includes audible warning of low oil pressure, and high coolant temperature. An immersion heater in the coolant system operates from mains supply while the crane is in the depot. The fuel tank, with a capacity of 125 imperial gal. also has an immersion heater and the tank is lagged.

A fuel transfer pump is provided to facilitate refuelling. Warming of the engine and other equipment in severe weather is by a Smiths combustion heater. The hot air is trunked through the superstructure, with suitable bleed-off points arranged for the defrosting of external equipment.

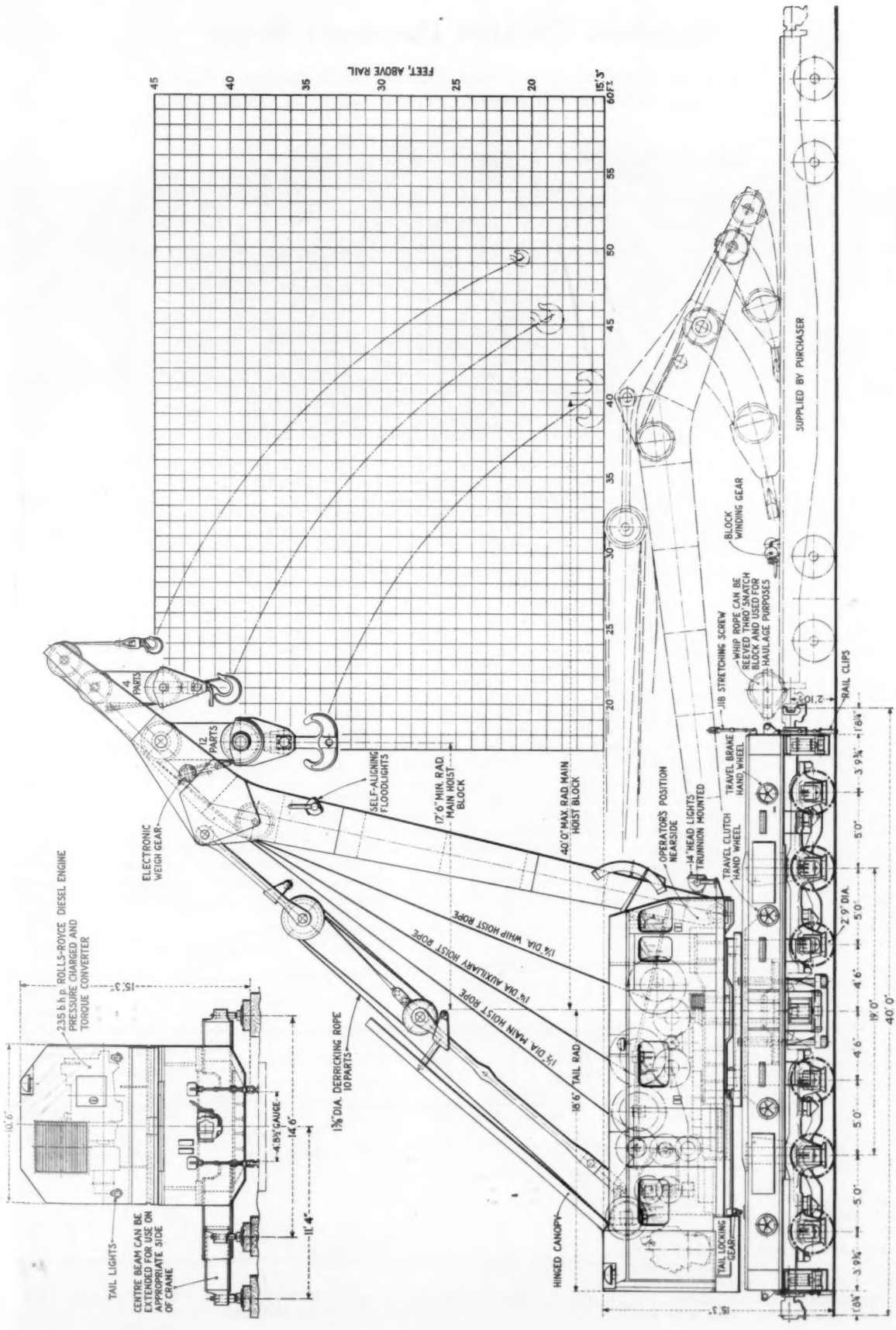
Auxiliary Diesel Generator

Electrical power for lighting and other services is supplied by an auxiliary generating set. The generator is a 4 kW. 115V, 60-cycle, single-phase, two-wire, a.c. machine. This is flange mounted and driven by a Lister twin-cylinder air-cooled diesel engine, rated at 8·5 h.p. at 1,800 r.p.m. The equipment includes elecric and hand starting, Start-Pilot carburettor, and immersion heater in the sump. This engine is arranged for starting down to 0°F.

The main drive from the hydraulic torque converter, which is mounted on the engine flywheel housing, is taken through an epicyclic reversing gearbox, with enclosed spiral-bevel gears. From the gearbox the drive is taken by longitudinal cardan-shafts to the crane machinery. The main block is carried on 12 falls, the auxiliary block on four falls, and the whip hook on a single fall of steel-wire rope. The main hook is of ramshorn type and all hooks are carried on ball or roller thrust bearings. Ropes are carried on cast-steel barrels, and the gearing is arranged in conjunction with the torque converter to provide automatically increased speeds with light loads. A separate positive multi-jaw clutch and brake is provided for each hoist. For the slewing rack the drive is transmitted through reversible friction clutches and bevel and spur gearing. A slewing brake is provided.

The jib is supported on a multiple purchase of steel-wire rope, the cast-steel barrel for which is driven through bevel, worm, and spur reduction gearing. The drive is of the self-sustaining type and a brake interlocked with the clutch is incorporated. Alloy-steel plate, welded to form a box section, is used for the swan-neck jib. The superstructure frame is of welded steel-plate construction, arranged to carry all the machinery, counterweight, engine, and auxiliary equipment. The structure is enclosed in a sheet-steel housing, insulated with a 2 in. thick Rock-sil lining. Roof sections over the main machinery are hinged and arranged to lift with the derricking tie-rods. Sliding doors at each side give access to the machinery compartment.

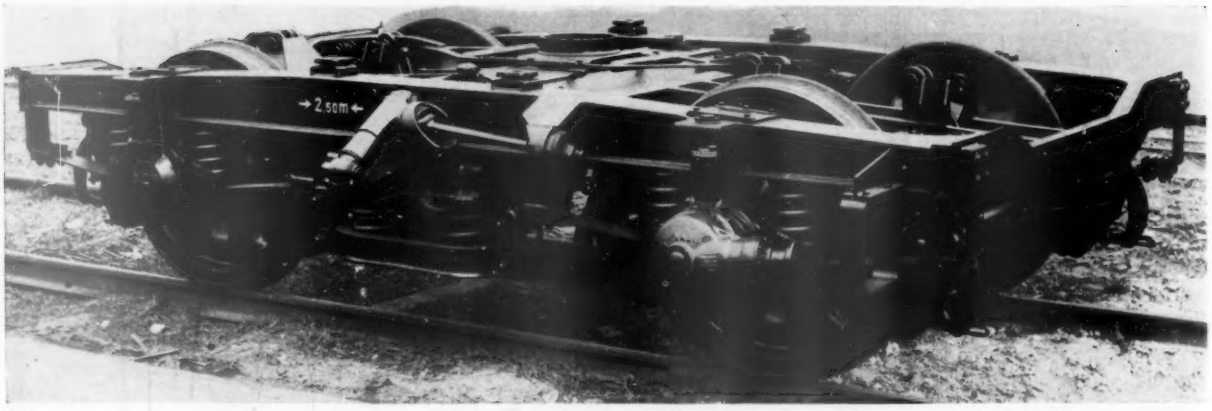
(*Continued on page* 654)



Side and end elevations of 250-ton crane for Canada, showing layout of machinery and principal dimensions

Standard German Passenger Bogie

Design with frictionless springing and novel axle-guiding methods is now applied in several countries to the extent of 10,000 *units*



A modern Minden-Deutz bogie with the supplementary outside bolster guide rod and cushion

AMONG the bogies now in wide use throughout Western Europe the so-called Minden-Deutz form is prominent, and has been more or less standardised for all new bogie passenger coaches on the German Federal Railway over the last seven or eight years. It is used also in Portugal, Sweden, Norway, Finland, Spain, Jugoslavia, and, further afield, in Australia, Africa, and the Philippine Islands; and the reputation of this bogie has become such as to attract North American attention, and a trial set has been acquired by Canadian National Railways.

The name results from the two collaborators in the evolution and construction of this bogie type, viz. the German Federal Railway's Zentralamt at Minden, which deals with all rolling-stock matters, and the Vereinigte Westdeutsche Waggonfabriken, better known as Westwaggon and now officially Klöckner-Humboldt-Deutz (Westwaggon Werke). For some time there has been full series production of these bogies, which now total nearly 10,000 (including those on order) made since 1952 when series production first began after two years of testing with 34 bogies installed under express passenger coaches.

Development Objectives

Principal objectives in developing the design were to eliminate the conventional axlebox guides and their wearing surfaces, and to have the guiding done by some other means without wearing points; to eliminate laminated springs with their high internal friction, and to substitute a spring system comprised solely of helical springs but with hydraulic damping; and to modify the connections between body and bogie so that the inherent lateral motion of the coach body should be of lower frequency than the lateral swing of the bogie arising primarily from the sinusoidal motion along the track of the coned wheels.

The first of these three objectives was achieved by what is perhaps the most notable feature of the Minden-Deutz bogie; that is the spring-steel leaves or links with fine-toothed ends which connect each axlebox to the bogie frame, and which take up all fore-and-aft and lateral forces.

Positive Location of Axle

By use of the leaf members, *a* (inner) and *b* (outer) in Fig. 1, the wheel-and-axle set is positively located with great exactness, is held, is guided vertically, and by the combination of *a* and *b* with the vertical spring-steel member *c* secured to the headstock, is guided laterally also. The complete spring-steel guiding unit of each axlebox deflects about 0·80 to 1·0 mm. per ton of shock load and the two guiding units of each wheel-and-axle set act together. The vital point of this arrangement is the fine-tooth locking and adjustment ends of the spring-steel guiding leaves and their brackets, details of which are shown in Fig. 2; and manufacturing, machining and assembling procedures have been adopted at the Deutz works of Westwaggon to give a high degree of accuracy in series production. The inner link is secured to the welded steel projection from the bogie frame by four fitted bolts *d* and lock nuts *e*, through the intermediary of the fine-toothed plate *d*; between this plate and the bogie-frame piece is a 2-mm. liner of frictional material.

Use of Helical Springs

In attaining the second objective, frictionless springing, the provision of helical springs at the axleboxes and for the bolster was felt to be less expensive than torsion bars or other devices, and could be adapted to a large range of car body weights.

The axleboxes are of simple design incorporating a cradle which takes a single-nest or double-nest helical spring at each side; and from the front

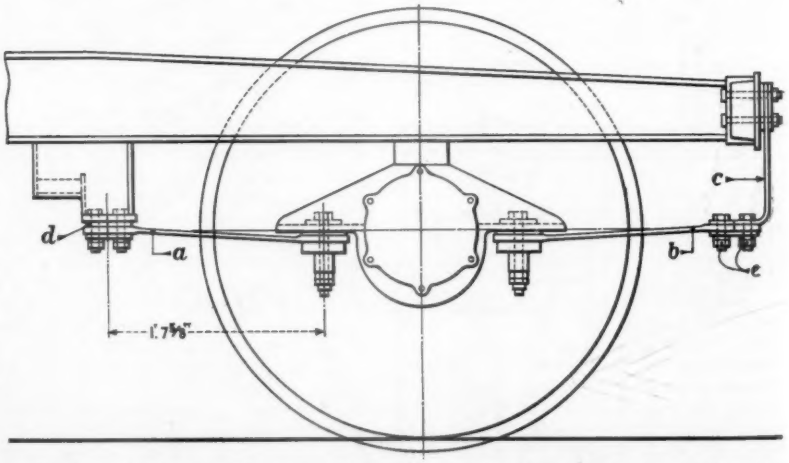


Fig. 1—Axlebox and its two adjacent side spring-steel guides (a and b) and third spring-steel end guide (c)

cover of the box a vertical hydraulic shock absorber extends up to a thrust bracket on the flanged box-section bogie frame longitudinal. The damping effect of this is about double in the thrust direction to what it is in the tension direction.

Articulated Swing Links

Of almost conventional mechanical construction, the swing-bolster with helical-spring secondary suspension achieves the third of the objects listed, principally through the proportions of the swing links and the springs, by the provision of articulated swing links, and through the action of a central hydraulic shock absorber at each side, set at an angle of 35 deg. to the horizontal so that it assists in damping both vertical oscillations of the car body and the lateral swinging of the bolster on the swing links. The general length of about 600 mm. (24 in.) of the swing links in these bogies is chosen to keep their swinging frequency smaller than that arising from the sinusoidal motion of the coned wheel treads, which in these standard-gauge bogies has been measured to correspond to a wave length between 17 and 24 m. according to the tread wear, though rarely reaching the lower figure; and here the spring-steel guiding leaves of the axleboxes play their part. As considerable side movement of the bolster cannot be accommodated in coaches built well out to the loading gauge and to prevent hard lateral shocks against the thrust plates of bolster and bogie frame, the swing links have been articulated; and after a swing of about 17 mm. (0·7 in.) the upper part of the link contacts a stop, while the lower part, continuing with a shorter pendulum swing, eventually brings the bolster up against a rubber buffer block.

Free and Frictionless Swinging

Construction and arrangement of the swing links and the bolster hydraulic shock absorbers are shown in the first illustration on page 652 and in Fig. 3.

Free and almost frictionless swinging of the links is assured by the knife edges and suspension nuts at the top; and bending stresses on the swing-link bolt by any out-of-centre movement is avoided. The helical-steel springing of the bolster is several times softer than that of the primary axlebox suspension. A normal flat-bearing centre pivot is used, and has a lining piece of friction material which does not need lubrication.

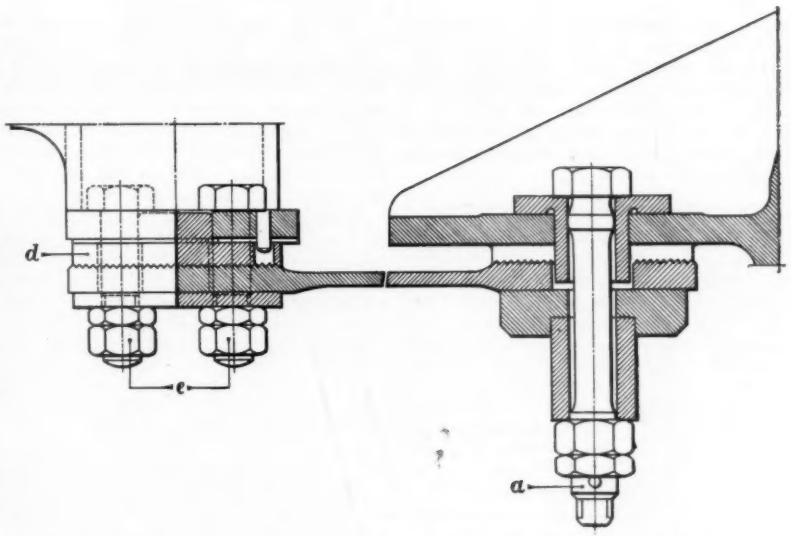


Fig. 2—Details of the fine-tooth locating and securing ends of the spring-steel guide plates

Principle Unaltered since 1952

Though unaltered in principle since 1952, the Minden-Deutz bogie has had several modifications made to it from time to time, most of them to improve stores and maintenance aspects, or to cut down manufacturing costs while retaining a high degree of accuracy. Most important of these was arranging the design so that, apart from changing springs and certain brake gear details, all of which are interchangeable in regard to mounting, the same bogie could be used for passenger coaches varying in total weight from 30 to 64 tons, and for coaches in which the ratio of laden to empty weight varied from 1·17 to 1·72 to 1.

Bolster springs and swing links are now on the same transverse centre lines, whereas in the prototype bogies the spring centres were closer than the swing links.

In the original design a transverse leaf-spring guiding unit connected the bolster and the bolster-spring plank, and ensured that the helical springs were subject to vertical loading only; but it was soon found that the supporting springs could take any supplementary lateral force which developed, and so the leaf spring was eliminated. On the other hand, a simple form of bolster guide and cushion has been fitted to certain bogies recently, as shown in the first illustration on page 652, principally to reduce shock longitudinal forces on heavy brake applications, and to a lesser extent to cushion any rapid acceleration forces; this supplements the rubber stop blocks between bolster and bogie cross member, but is not yet considered as a standard fitting for all new construction.

Lightweight Wheels

A corrugated lightweight design of disc wheel of 950 mm. (37½ in.) dia. has replaced the original conventional disc wheel, with which braking reverberation "shrieks" were prevalent with double-block rim brakes where the

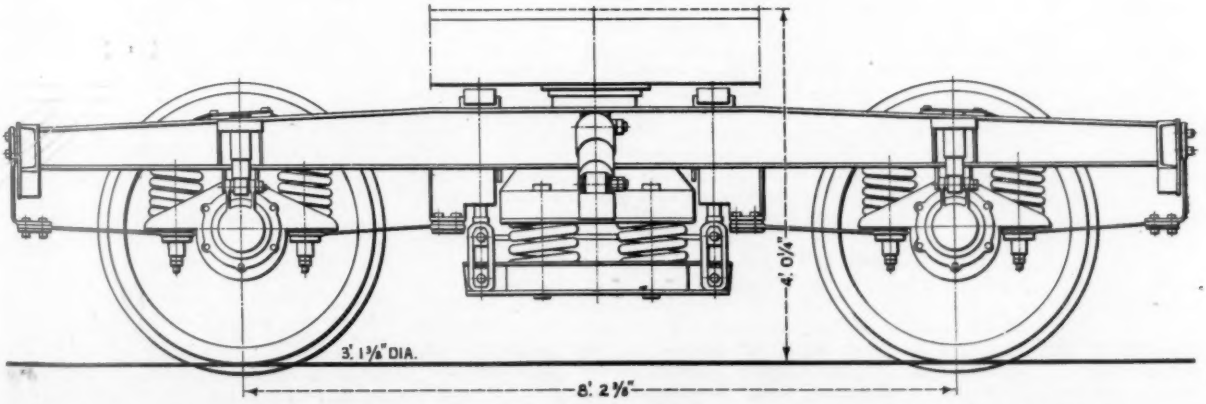


Fig. 3—Elevation of a Minden-Deutz bogie without the supplementary outside guide rod for the bolster

centre of pressure was not coincident with the centre of the wheel and axle.

Bogies of this type have now been applied to a variety of rail gauges from 3 ft. 6 in. (1,067 mm.) to 5 ft. 6 in. (1,676 mm.) without structural alterations, except wider cross members, in the gauges above 4 ft. 8½ in.

"Cape" Gauge Versions

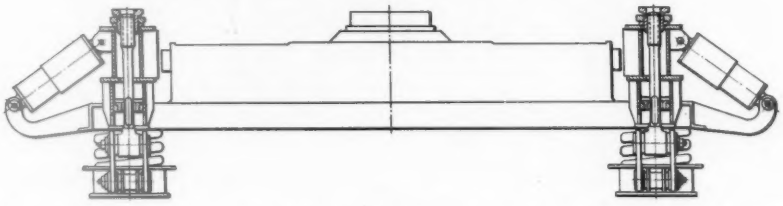
In versions of the bogie which are of "Cape" gauge, to get a wide spring spread, the bolster springs and the axlebox-guiding units could not be retained at the same transverse centre distances, and so in these cases the bolster protrudes beyond the bogie frame structure, and the bolster springs are located at something like 2·0 m. (6 ft. 6 in.) transverse centres.

Also, sealed dust-proof hydraulic shock absorbers have been fitted to bogies operating over sandy terrain or in atmospheres which are heavily laden with dust.

The majority of the 4,000 or so 26·4-metre (86½ ft.) main-line passenger coaches of the German Federal Railway, some of which make 350,000 km. (218,000 miles) a year, are now fitted with Minden-Deutz bogies, and these units, with a wheelbase of 2·5 m. (8 ft. 2½ in.) weigh under 10 tons, including the necessary high-speed air-brake equipment.

With a few of these German Federal Railway bogies variations are now being tried to see if any advantage may be gained by the use of the latest forms of rubber and pneumatic springing for bolsters and axleboxes.

Other lightweight variations of the Minden-Deutz design are also to be found in electric motor-coaches on German private railways, and on twin-car diesel sets on the Luxembourg Railways; and the type is being applied also to about 500 lightweight suburban bogie coaches now on order for use on the German Federal Railway.



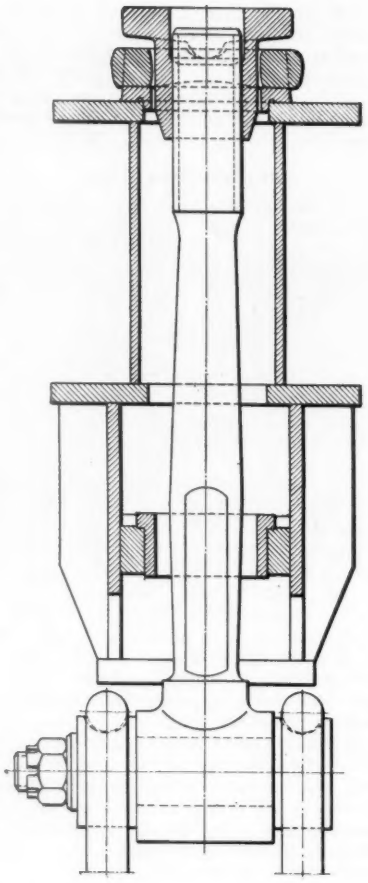


Fig. 4—The bolster and its articulated swing links and inclined hydraulic damper with (right) enlarged detail showing at top the knife-edge adjustable suspension nut sectioned

Diesel-Hydraulic 250-ton Railway Breakdown Crane

(*Concluded from page* 650)

The driver's cab in one corner of the superstructure has a fully adjustable upholstered seat and double-glazed windows. At the driver's front window a heavy-duty marine-type screen wiper and de-icing equipment are installed. On the control desk are a bank of Westinghouse Pilotair control valves and below the desk are the main-brake pedals. Handwheels are provided for locking the brakes. To the left of the seat are Teleflex controls for the main engine and for the Smiths combustion heater.

The superstructure rotates on a large-diameter roller thrust bearing incorporating a live ring of conical rollers and a centre pin for alignment and to carry the vertical forces. The carriage frame is a welded assembly of steel plates comprised of two longitudinal side girders rigidly connected by headstocks, with cross-girders under the roller path and at the bogie pivots. Telescopic draw-beams, or outriggers, equipped with screw-jacks at the outer ends, are provided in housings at the centre and ends of the frame. These drawbeams and jacks may be operated manually or with a power-driven wrench. Quick-acting rail clips are attached to each headstock. The central automatic couplers are equipped with E.S.C.C./National friction-type draft gear. Provision is made on each headstock for the attachment of a snatch-block to allow the whip-hook to be used for haulage purposes.

Commonwealth Bogies

The bogie frames are of Commonwealth one-piece cast-steel construction with plain-bearing axleboxes and solid rolled-steel-disc wheels. Axleloads are equalised and when the crane is working the springs are relieved of excess load by means of jacking screws embodied within each spring group.

The drive for travel is taken from the superstructure through the centre pin, and thence to the inner axle on each bogie through spur and bevel reduction gearing. Sliding pinions, operated by handwheels on the frame-side, enable the drive to be disconnected when the crane is being hauled in a train.

Westinghouse type "A.C." air-brake equipment provides automatic braking when running in a train. Clasp-brakes operate on all wheels through fully-compensated rigging; a separate air-cylinder is mounted on each bogie. Independent straight-air braking is controlled by the driver's brake valve. The hand-brake operates through the power-brake rigging. Bearings are grease-lubricated from a manually operated Wakefield centralised lubrication system.

The crane is equipped with two 100-W. floodlights at the jib head, two 250-W. floodlights on the front of the superstructure, tail lights, cab lights, and hand inspection lamps. Sockets on the superstructure provide up to 2kW. of power for external use. This current is supplied by the auxiliary generating set.

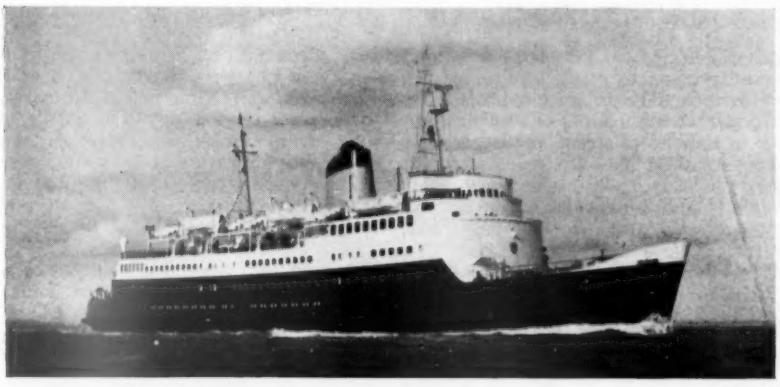
Sub-contractors included:—

Air brakes and controls...	Westinghouse Brake & Signal Co., Ltd.
Engine and torque converter	Rolls-Royce Limited
Bogie frames and automatic couplings ...	English Steel Castings Corporation Limited
Welded fabrications ...	Palmers Hebburn Co. Ltd.
Combustion heater ...	S. Smith & Sons (England) Ltd.
Cooling equipment ...	Serck Radiators Limited
Auxiliary generating set	R. A. Lister & Co. Ltd.
Load indicator	Elliott Bros. (London) Ltd.

WESTERN REGION FREIGHT LINE TO CLOSE.—British Railways, Western Region, has announced the withdrawal of the freight service between Dawley & Stirchley and Coalport East on December 5. Stations at Madeley Market, which at present deals with parcels and freight traffic, and at Coalport East which handles freight only, will be closed. Freight in truck loads at present dealt with at these stations will, in future, be handled at Madeley (Salop), Coalport West or Ironbridge & Broseley. Facilities for handing in or collection of parcels by the public, formerly dealt with at Madeley Market, will be available at Ironbridge & Broseley. Passenger services over the branch line were withdrawn in 1952.

Southern Region Channel Islands Ship

One-class ship built for new pattern of services between Weymouth, Jersey and Guernsey



British Railways Channel Island ship ss. " Caesarea "

THE largest ship ever built for British Railways, Southern Region, Channel Island routes, the *Caesarea*, is to enter public service today, as a replacement ship on the present services. For the new services next May, it will be joined by its sister ship, *Sarnia*, and *St. Patrick*, a post-war vessel which is to be extensively refitted and brought up to the same standard of one-class comfort.

Layout of Ship

The *Caesarea* has two continuous decks, main and upper, with a promenade deck, boat deck, and navigating bridge deck above the upper deck. The lower deck extends forward and aft of the machinery spaces. It has a raked stem, rounded stern, two tripod masts and single funnel designed specially to ensure that the products of combustion are swept clear of the decks in all weather conditions.

All exposed weather decks are sheathed with teak: the hull below the main deck (bulkhead deck) is subdivided into watertight compartments by 11 watertight bulkheads. A cellular double bottom is fitted throughout except in way of the fore and aft peaks and aft shaft tunnel. All double bottom tanks are arranged for the carriage of water ballast or fresh water. Furnace fuel oil, diesel oil, and distilled water are carried in deep tanks above the double bottom, with fresh water in wing tanks at the aft end of the engine room.

The principal characteristics are as follow:—

Length overall	322 ft.
Length on waterline	312 ft.
Breadth, moulded	51 ft.
Depth, moulded to main deck ...	18 ft. 9 in.
Draught, mean loaded	13 ft. 6 in.
Gross tonnage	4,174
Horse-power at shaft	8,500
Corresponding r.p.m.	275
Designed speed	20 knots

Balanced rudder aft and a bow rudder, to enable the vessel to navigate stern first when entering port, are operated by rotary-vane type steering gears of A.E.G. manufacture, the power being supplied by hydraulic pumps by electric motors. Control from the bridge in each case is electric. Direct current electricity supply at 225 V. is provided by three main 225-kW. and one emergency 50-kW diesel driven generators; two motor alternators supply fluorescent lighting. Denny-Brown type stabilisers are installed to minimise rolling.

Two single-casing steam turbines, of Pametrada design, each drive a three-blade Novoston alloy propeller through articulated locked-train double-reduction gearing. Steam for the main machinery at a pressure of 350 lb. per sq. in. and a temperature of 650°F. is supplied by two Foster Wheeler oil-fired watertube boilers fitted with superheaters. The boilers work under an open stokehold forced draught system, air being supplied by turbo driven fans.

Steam for domestic services, bunker heating, and so on, and supply to the distiller, the latter providing make-up feed for the main boilers, is supplied by two oil-fired Spanner boilers working at a pressure of 60 lb. per sq. in.

Passenger Accommodation

One-class accommodation is provided for 1,400 passengers. Passengers are carried on all decks except the navigating bridge deck, and there is private accommodation for 62 passengers in one and two berth cabins on the lower deck forward, and two cabine-de-luxe on the promenade deck. The public rooms, restaurant, cafeteria, and bar have been planned to provide easy maintenance. Teak, combined with plastics, has been used for some of the wall veneers and for much of the furnishings. The internal decorations were carried out by Trollope & Son (London) Ltd. to designs prepared by Dr. F. F. C. Curtis, Architect, British Transport Commission.

Life-saving apparatus includes six fibre glass lifeboats with built-in buoyancy. Two of the boats are propelled by diesel engines and four by hand mechanical propelling gear. In addition to the boats 45 inflatable liferafts are installed.

The ship was built by J. Samuel White & Co. Ltd. at Cowes, Isle of Wight.

Smoke room and bar in " B " deck

Seating in the lounge on " B " deck

Boiler Water Treatment in U.S.S.R.

Some Russian views on the prevention of foaming and carry-over in locomotive boilers

(*By a correspondent*)

IN general, the principal method of preventing foaming and carry-over of boiler water by steam has been to blow down the boiler, thus decreasing the concentration of dissolved salts in the boiler water. Various mechanical devices for separating water from steam have been tried out at different times and have included impact and perforated plates, various types of baffle, steam separators and devices for washing away foam; but none of these devices ever gave really satisfactory results.

Many studies have also been carried out to find chemical methods of preventing foaming and carry-over of boiler water. A large number of organic and inorganic compounds have been tested over many years, both under laboratory and operating conditions, and, as a result, reasonably effective chemical anti-foams were developed; these are high-molecular surface-active substances, which in the main are polyamides of fatty acids. There are various types of chemical anti-foams, which have more or less the same effectiveness in preventing foaming, and the following notes on some of these, their action and methods of application, are based on a publication recently issued in the U.S.S.R.

Varieties of Anti-foam

The best known anti-foams, which may be taken as examples, are prepared from octadecylamine and sebacic acid, from ethylenediamine and stearic acid, and from hexamethylenediamine and stearic acid. The most effective of these is di-octadecylamide, but it has not been widely used because of the difficulty of obtaining the starting materials. Slightly less effective as an anti-foam is that prepared from hexamethylenediamine and stearic acid, but it has been widely used because of the possibility of producing the starting materials, both in stationary and in locomotive boilers. The substance produced by the reaction between hexamethylenediamine and stearic acid was given the name distearyl hexamethylenediamide or, for short, " diamide."

Action of Anti-foams

To prevent foaming and carry-over of boiler water with steam, the nature of the boiling process has to be changed from that in which numerous small steam bubbles are formed to the production, both at the heating surface and in the bulk of the water, of larger bubbles, which are not capable of forming a foam. It is precisely this property which is possessed by the chemical anti-foams when they are introduced in small amounts into the boiler water.

A chemical anti-foam reduces the wettability of the heating surface, the layer of boiler water in contact with which is strongly heated, so that extremely rapid evaporation takes place, leading in turn to the formation of larger bubbles. The stronger the heating, the smaller the number of bubbles of steam, the larger their size, and the higher the speed at which they rise in the bulk boiler water. For this reason anti-foams are effective.

Apart from this, chemical anti-foams strongly effect the coalescence of the steam bubbles directly at the heating surface itself, up to the time at which they separate from it and subsequently, as a result of which larger bubbles are formed. This effect of chemical anti-foams on the steam bubbles at the instant of their formation is probably of equal importance to the settling-out and destruction of foam at the evaporation surface.

Surface Tension

At the same time as the anti-foams act by causing a smaller number of steam bubbles to be formed in the heated water, another factor may also have to be taken into account: the reduction in the surface tension of the film surrounding the bubble, which causes the coalescence of the rising steam bubbles and their rapid destruction at the evaporation surface. The particles of the anti-foam are absorbed on to the outer surfaces of the steam bubbles, and decrease the surface tension, as a result of which it becomes easier for the bubbles to coalesce; they therefore increase in size and are not retained in the boiler water, but are instantly destroyed on reaching the evaporation surface, so that foam is not produced. Both frothing and foaming of the boiler water are prevented, and an improved boiling process is observed in the boiler.

Additive for Anti-foam

It has been observed in tests on anti-foams that these lose their effectiveness when the heating surface becomes too hydrophilic. This can be explained by the fact that the films formed on the wetted surface apparently hinder further absorption of the anti-foam. By addition to the anti-foam of a tannin extract, or alkaline sulphite-cellulose, its effectiveness in an alkaline medium is increased. Apparently, the organic colloids absorb hydrophilic colloids formed from magnesium hydroxide and other sludge particles, as a result of which the surface becomes less hydrophilic. The presence in the boiler water of appreciable amounts of sludge, which absorb the particles of the anti-foam, significantly reduces the effectiveness of the anti-foaming action.

Chemical anti-foams are extremely active, and can prevent frothing, foaming, and carry-over of boiler water by steam at doses of no more than 0·3-0·5 grammes per ton of water being treated. The introduction of anti-foams has been particularly effective in regions where the feed-water had a high dissolved solids content. The use of anti-foams makes it possible to increase appreciably the dissolved solids concentration, to increase the rate of evaporation of the boiler water, raise the steaming rate of the boiler, and increase the saturated steam temperature.

Reduced Deposit Formation

Apart from this, anti-foams improve the operating conditions of locomotive boilers and are claimed to reduce the rate of deposit formation in the superheater, reduce fuel consumption, significantly reduce the amount of work required, and improve safety conditions in the work of the locomotive crews. Anti-foam mixtures, prepared in the form of a powder and made up in the form of special packets of weight 10-15 grammes, can be added to the driver, under the direction of the railway's chemical laboratory or other authority.

Apparently in the U.S.S.R. the anti-foam is added to the boiler by a special device fitted to the injector. For this purpose, the 10–15 gramme packet is emptied into a mug or other vessel of 0·25 litres volume, hot water is added, poured into the funnel or container, and introduced into the boiler during the operation of the injector. To increase the effectiveness of the anti-foam, it is desirable to maintain the alkalinity of the boiler water at not less than 8-10 mg. equivalents/litre, and to keep the boiler water PH value in the range 9·5–10·5.

Amount of Dosage

After a locomotive boiler has been washed, and while the dissolved-salts concentration of the boiler water has not reached its limiting value, there would be no point in introducing an anti-foam during the first three or four journeys. The dose of anti-foam to be used and the time of its introduction into the boiler water depend on the feed-water and boiler-water quality, the make-up of the train, and the route characteristics, and is worked out by the depot under the direction of the chemical laboratory.

Since anti-foams are absorbed by sludge, the boiler should be blown down frequently, but in small amounts, and if possible before the introduction of the dose of anti-foam. An anti-foam cannot completely prevent carry-over of water due to causes independent of the boiler-water quality, such as sudden opening of the regulator, rise in the water level as a result of feeding in excessive amounts of water, etc.

CHANGE OF NAME.—From January 2, 1961, Wakefield-Dick Industrial Oils Limited, is to be renamed Castrol Industrial Limited.

RAILWAY NEWS SECTION

PERSONAL

We regret to record the death on November 12, of Mr. C. E. Jefferson, who was Vice-President, Traffic, Canadian Pacific Railway, from 1950 until his retirement in 1957.

Mr. Ajit Kumar Mullick, A.M.I.E. (India), M.I.Loco.E., Chief Mechanical Engineer, Eastern Railway of India, who, as recorded in our October 21 issue, has been appointed Senior Deputy General Manager of the South Eastern Railway of India, was born in 1907. He was educated at St. Xavier's College, Calcutta, and the Leys School, Cambridge. Later he became a pupil of Mr. R. E. L. Mannsell, then Chief Mechanical Engineer of the Southern Railway, England, and also studied at Southampton College. He joined the former Eastern Bengal Railway as an Assistant Locomotive (Carriage & Wagon) Superintendent, and was posted to Lalmanirhat in North Bengal in 1931. In 1938 he was promoted to the Senior Scale. During the 1939-45 war, he served as an Assistant Technical Recruiting Officer, Indian Engineers Corps, Calcutta, and as Second-in-Command of the Bengal Assam Railway group of the Defence of India Corps. At the time of partition, Mr. Mullick was serving as Works Manager, Saidpur, Bengal Assam Railway. He was subsequently transferred as Works Manager (Carriage & Wagon) to Kanchrapara, and officiated in the Junior Administrative grade as a Deputy Chief Mechanical Engineer in late 1947. He became Deputy Chief Mechanical Engineer (Running, Carriage & Wagon) in the East Indian Railway Head Office in 1948, and in the following year he was transferred to Jamalpur as Deputy Chief Mechanical Engineer. In 1949 he returned to Calcutta as Deputy Chief Mechanical Engineer, Eastern Railway of India, and on the regrouping of railways in 1952 he was transferred as Chief Mechanical Engineer, Northern Railway, Delhi. He became Chief Mechanical Engineer of the Eastern Railway in 1956, and in July, 1960 he was appointed Senior Deputy General Manager, South Eastern Railway.

Mr. A. K. Mullick
Appointed Senior Deputy General Manager South Eastern Railway of India

Mr. S. B. Zaheer
Appointed Chief Personnel Officer, Northern, Railway of India

Eng. Pedro Petisco has been appointed Chief of the Stores Department, General Mitre Railway, Argentina.

Mr. Thomas H. Martin, General Manager of the Express Department, Canadian National Railways, has retired.

Mr. William H. Neale, Assistant District Passenger Agent, Toronto, Canadian National Railways, has been appointed Assistant to Manager, Foreign Freight Sales.

The Institution of Railway Signal Engineers

The following additions to the Register of the Institution of Railway Signal Engineers have been approved:—

Associates

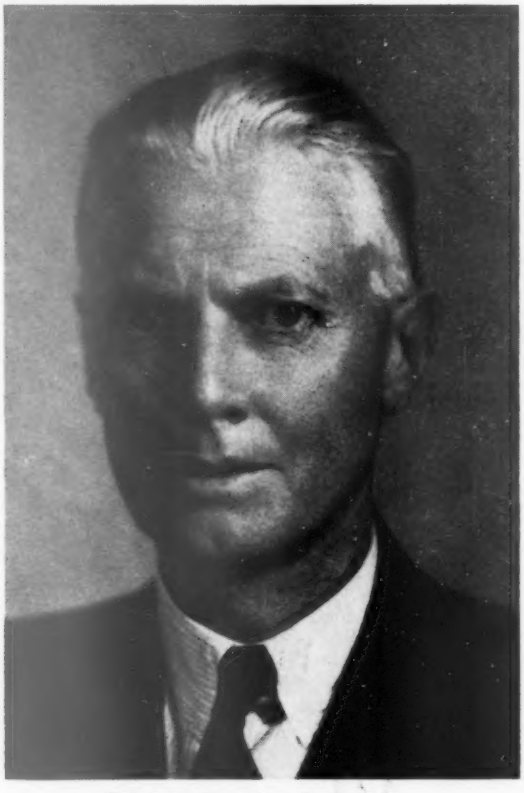
Mr. G. W. Gore, Development Group Leader, Messrs. Mullard Equipment Limited, Research Laboratories, Redhill, and Mr. I. McWhirter, London Office Manager, Pirelli-General Cable Works Limited.

Among those appointed as individual members of the Export Council for Europe, under the chairmanship of Sir William McFadzean, are Mr. A. J. S. Brown, a director of Stone-Platt Industries Limited, Mr. A. M. Browne, chairman & Managing Director of Hackbridge & Hewittic Electric Co. Ltd., Dr. A. Caress, a director of Imperial Chemical Industries Limited, Mr. H. McNeil, Managing Director of Babcock & Wilcox Limited, Mr. E. W. Senior, Commercial Director of the British Iron & Steel Federation, and Mr. J. C. Snow, a director of Snow & Co. Ltd.

Mr. S. B. Zaheer, Divisional Superintendent, Jodhpur Division, Northern Railway of India, who, as recorded in our November 11 issue, has been appointed Chief Personnel Officer of that system, was born in Lucknow in 1915. He was educated at Canning College, Lucknow University, New College, Oxford University. Subsequently he was appointed as an Assistant Traffic Superintendent on the former East Indian Railway in late 1940. He was appointed to the senior scale in April, 1946, and in 1949 he became Superintendent, Railway Training School, Chandausi. On the formation of the Northern Railway in 1952, he became Superintendent, Kanpur Area. He was then promoted to the Junior Administrative grade and in August, 1955,

he was transferred to the Headquarters as Deputy General Manager (Amenities), and later to the Operating Department as Deputy Chief Operating Superintendent (Coaching). In 1957 Mr. Zaheer was appointed to the Bikaner Division as Divisional Superintendent and later to the Jodhpur Division in the same position which he has now vacated.

We regret to record the death at Farnham on November 19 of Brigadier John Aiton Bell, C.B.E., formerly Agent & General Manager of the East Indian Railway. Born in July, 1887, he was appointed to the Indian State Railways service as an Assistant Engineer in October, 1910. After experience in various construction works and on the Indo-Burma Railway survey, Mr. Bell was on military service from October, 1915, until September, 1919, latterly serving in Mesopotamia, where he built several big bridges, including two over the Euphrates. After the war, he gained further survey and constructional experience on return to India, when his services were lent to the Bengal-Nagpur Railway from March, 1923. He rejoined the East Indian Railway as Officiating Executive Engineer in April, 1927. Between 1930 and 1935 he was a Divisional Superintendent on that railway, and was appointed to officiate as Agent (General Manager) in October of the latter year, an appointment in which he was confirmed in January, 1936. In July, 1939, he became a member of the Permanent Commission of the International Railway Congress Association, but on the outbreak of hostilities in September of that year, he retired from India and rejoined the Royal Engineers. During the war he served with field rank on various fronts. One of the last works for which he was responsible as Director of Railways, 21st Army Group, 1944–45, was the construction of the half-mile bridge over the Rhine at Spyck, known as the Victory Bridge, completed despite difficult weather conditions in under a month.



The late Brigadier J. A. Bell
Formerly General Manager, East Indian Railway

The late Major J. B. G. Taylor
Formerly a director of the Benguela Railway Company

Institute of Transport (Rhodesia Section)

Mr. J. W. S. Pegrum, who, as recorded in our November 18 issue, is retiring from the position of General Manager, Rhodesia Railways has relinquished the Chairmanship of the Institute of Transport (Rhodesia Section). He is succeeded as Chairman by Mr. F. W. Austin, former Vice-Chairman, and Mr. A. H. Croxton, Principal Executive Officer (Movement), Rhodesia Railways, has been elected Vice-Chairman. Committee members are Mr. J. H. Allen, Mr. J. E. Everington, Mr. A. Ferguson, Mr. J. D. Hale, Mr. J. Henderson, Mr. L. A. W. Hawkins, Mr. P. A. Losty, Mr. F. Lever, Mr. A. Lines, Mr. B. M. E. O'Mahoney, Mr. J. W. S. Pegrum, Mr. L. G. Salt and Mr. W. C. Wayland.

We regret to record the death of Mr. P. R. Turner Wills, a former Commissioner for the Queensland Government Railways.

We regret to record the death of Mr. A. W. Arthurton, formerly Secretary, British Railways Press Bureau.

Mr. C. Williams, District Traffic Superintendent, Exeter, British Railways, Southern Region, is retiring. He will be succeeded by Mr. F. V. Spillard, at present Assistant District Traffic Superintendent, Redhill.

Mr. P. J. C. du Plessis, M.P., for Bloemfontein, Union of South Africa, has been appointed a member of the South African Railways & Harbours Board.

Major J. B. G. Taylor, formerly a director of the Benguela Railway Company, whose death was recorded in our November 11 issue, was born in June, 1882, at Eccles in Lancashire. He was educated at Denstone College, Staffordshire, and served in the Yorkshire Hussars Yeomanry during the Anglo-Boer war. He was invalided to England, but returned to South Africa later to join the Cape Central Railway, with which he served until 1914, attaining the position of Personal Assistant to the General Manager. On the outbreak of hostilities in 1914, he joined the Union Defence Force as Captain and Adjutant of 17th Mounted Rifles, and served in Europe with the Rifle Brigade until 1918. In 1919 he returned to South Africa and was appointed Assistant General Manager of the New Cape Central Railway. Two years later he left South Africa to become Railway Adviser to Tanganyika Concessions Limited, and in 1924 he was appointed a member of the Board of Auditors of the Benguela Railway Company. In 1940 he was recalled for national service under the Army Officers Emergency Reserve, and was appointed to a command in the Pioneer Corps. In 1942 he rejoined the Benguela Railway Company as a director, until his retirement in 1953.

Mr. W. N. Griffiths, District Running & Maintenance Officer, Cardiff, British Railways, Western Region, who has been appointed Running & Maintenance Officer, Divisional

Mr. W. N. Griffiths

Appointed Running & Maintenance Officer, Divisional Traffic Manager's Office, Cardiff

Traffic Manager's Office, Cardiff, entered the service of the former Great Western Railway Company as an apprentice at the Swindon Locomotive Works in 1927. Following his period of training, which included seven years in the Drawing Office at Swindon, he was seconded to the Chief Engineer as Steel Works Inspector, South Wales, for a period of three years. He was then appointed Assistant to the Divisional Locomotive, Carriage & Wagon Superintendent of the Chief Mechanical Engineer's Department at Cardiff in 1942, and, in 1946, Assistant Divisional Superintendent of the Chief Mechanical Engineer's Department at Wolverhampton. This post was re-designated Assistant District Motive Power Superintendent, Wolverhampton, in January, 1950. A month later he was appointed Assistant to the Motive Power Superintendent (General), Swindon Headquarters, and subsequently Assistant (Mechanical) to the same officer. In 1953 he was appointed District Motive Power Superintendent, Cardiff, which was re-designated District Running & Maintenance Officer in 1957. Mr. Griffiths is an Associate Member of the Institute of Mechanical Engineers, and a member of the Institute of Locomotive Engineers, and of the Permanent Way Institute. He is a Whitworth Prizewinner and was also awarded the Great Western Railway Chairman's Prize during his training period in 1930.

Mr. W. T. Masterson, Secretary to the Rhodesia Railways Higher Authority, has been appointed Executive Vice-Chairman, Rhodesia Railways Board.

Mr. G. J. Harris, Regional Accountant, British Railways, London Midland Region, retired from that position on November 30, after 45 years of railway service.

Mr. F. G. Richens has been appointed Assistant (Modernisation) General Manager's Office, Paddington, British Railways, Western Region.

Mr. Frank Cousins, General Secretary of the Transport & General Workers' Union, has been appointed a member of the Council for Scientific & Industrial Research. He succeeds Mr. H. Douglass, General Secretary of the Iron & Steel Trades Confederation, who has retired from the Council on completion of his term of service.

Mr. W. H. Hardy, Head of Freight Section, Divisional Traffic Manager's Organisation, Liverpool, British Railways, London Midland Region, has been appointed District Goods Manager, Warrington.

Mr. A. K. Dytch, Acting Assistant Motive Power Officer, British Railways, North Eastern Region, has been appointed District Traffic Superintendent, York.

Mr. K. F. Mason, District Goods Manager, Warrington, British Railways, London Midland Region, has been appointed District Traffic Superintendent, Chester, in that region.

Mr. J. L. Evans has been appointed Goods Agent, Alexandra Dock, Liverpool, London Midland Region, British Railways, and Mr. W. Kirwan has been appointed Goods Agent, Poplar Dock, London, in the same Region.

Mr. Arnold Lindley, who has been elected to the Chairmanship of the General Electric Co. Ltd., was born in Kent in 1902. In 1918 he joined the G.E.C. as an engineering apprentice at the Erith Works, and took a part-time course at Woolwich Polytechnic for four years, eventually becoming an M.I.Mech.E. In 1932 he was transferred to South Africa and became Chief Engineer of the British General Electric Company of South Africa. Shortly afterwards he was appointed a director & Assistant General Manager of the South African Company. He was also appointed a director of the East Rand Engineering Company, one of the largest engineering concerns in South Africa. In this capacity he pioneered the manufacture in South Africa of heavy mining and other mechanical equipment. His work led to the expansion of these industries by the South African Government, and Mr. Lindley was appointed to advise on the equipment and layout of new heavy engineering works. He was recalled from South Africa in 1949 to take up the appointment of General Manager of the G.E.C. heavy mechanical engineering works at Erith, and was appointed a director of the G.E.C. in 1953. On Mr. Lindley's recommendation the company entered the new field of atomic energy in 1954 and the responsibility for G.E.C. atomic energy development was delegated to him. In 1958 he was made an Assistant Managing Director in charge of the Heavy Engineering Group of the Company and in June, 1959 he became Vice-Chairman and a Managing Director.

Mr. W. M. Dravers, a director of The City of Oxford Motor Services Limited, has been appointed Chairman of the company in succession to Mr. R. P. Beddow, who has resigned from the board of the company. Mr. E. L. Taylor has been appointed a director of the company.

Mr. A. B. Arundale, M.A., Sales & Development Assistant to the Line Traffic Manager (Great Eastern), Liverpool Street, British Railways, Eastern Region, who, as recorded in our November 4 issue, has been appointed District Goods Manager, London, Broad Street, London Midland Region, was educated at Brentwood School, and is a former Exhibitioner of St. Catharines College, Cambridge. During the Second World War he served in the Royal Navy with the rank of Lieutenant, and was Mentioned in Dispatches. He started his railway career as a Traffic Apprentice at Killingworth, Northumberland, in 1946, and after the completion of his training in 1948, he was appointed Head of the District Passenger Manager's Development Section, Newcastle. Two years later he transferred to York where he was successively Head of the Combined Excursion & Programme Section in the Commercial and Operating Departments, and Head of the newly-formed Central Timing & Diagramming Office. In 1955 he was appointed Assistant District Commercial Manager, Norwich, and in 1957, Sales & Development Assistant to the Line Traffic Manager (Great Eastern), Liverpool Street, the position he leaves for his new appointment.

Mr. A. B. Arundale

Appointed District Goods Manager, London, Broad Street, London Midland Region

Mr. H. Hanley, Stationmaster, Shrewsbury, British Railways, Western Region, has been appointed Stationmaster, Perth, British Railways, Scottish Region.

Lord Geddes, a former member of the Scottish Tourist Board, has been elected Deputy Chairman of the British Travel & Holidays Association in succession to Sir Howard Roberts.

Mr. G. Watkinson has been appointed a member of the Transport Users' Consultative Committee for the South Eastern Area, representing agriculture.

Mr. J. Hounsell, Assistant Publicity Manager, Westinghouse Brake & Signal Co. Ltd., has been appointed Publicity Manager, and Mr. A. A. Rhodes has been appointed Deputy Publicity Manager.

Mr. R. W. Birch, a director of the South Wales Transport Co. Ltd., has been appointed Chairman of the company in succession to Mr. W. T. James, who will shortly retire. Owing to the pressure of other business commitments, Mr. J. S. Wills has resigned from the board of the company, and Mr. E. L. Taylor and Mr. F. K. Pointon have been appointed directors.

Mr. W. D. C. Cormack, Publicity Manager, Thos. Cook & Son, Ltd., has been elected Chairman of the Society of Members of the Advertising Association for the second time.

Mr. A. F. R. Carling has been appointed to the Boards of Northern General Transport Co. Ltd., Sunderland District Omnibus Co. Ltd., and Tyneside Tramways & Tramroads Co. Ltd., and has been appointed Chairman of those companies in succession to Mr. W. T. James, who has resigned from the Boards. The companies are associates of the British Electric Traction Co. Ltd.

NEW EQUIPMENT AND PROCESSES

Truck-Mounted Crane

THE Lambert five-ton Hydrocon "Highlander" rotary hydraulic truck-mounted crane has been designed specially to operate on a British Railways Grampus wagon, as shown on this page. With jib lowered, the crane will pass under a standard railway bridge. The ballast block has been constructed in two parts to prevent overhang into adjacent railway lines.

Further details can be obtained from the manufacturer, The Lambert Engineering Co. Ltd., Glasgow.

Air-Operated Sump-Drain Tank

THE Gresham & Craven portable suction and pressure tank for emptying locomotive diesel-engine sumps, drums, or any other open vessel, and for transporting the contents to convenient disposal points, takes the form of a 40-gal. pressure vessel mounted on wheels and fitted with a compressed-air operated ejector, suction and delivery connections, and control valves.

A ½-in. flexible hose 15 ft. long enables the unit to be coupled to any compressed-air supply point, and a 10-ft. length of reinforced 1½-in. bore flexible pipe is carried to drop into sumps or to deliver the contents of the vessel to overhead tanks or other disposal points. Liquids can be lifted from a sump at the rate of about 20 gal. per min. The unit will discharge at the same rate against a maximum head of 20 ft. (water). The maximum suction lift is 20 ft. (water).

Compressed air at 70–80 lb. per sq. in. is required to operate the ejector, which creates the necessary degree of vacuum in the portable tank during the suction period. Air consumption does not exceed 12 cu. ft. of free air per min. compressed to 80 lb. per sq. in. To empty the tank the main discharge valve is opened and the ejector outlet is blanked by turning the handle. Compressed air is then diverted into the tank above the surface of the liquid to force it out through the flexible hose.

Further details may be obtained from Gresham & Craven Limited, 15, Whitehall, London, S.W.1.

Wallboard Patterns

THE Warerite wallboard range has been augmented by two new patterns, bringing the total range of patterns and colours to 18.

The first of these patterns is Australian Walnut, a rich woodprint. The second is an entirely new design—Palazzo Marble. As with all Warerite laminated plastics range, these new wallboards can be cleaned off with a damp cloth and it is claimed that they will retain their finish and original colour indefinitely.

Further details may be obtained from Bakelite Limited, 12, Grosvenor Gardens, London, S.W.1.

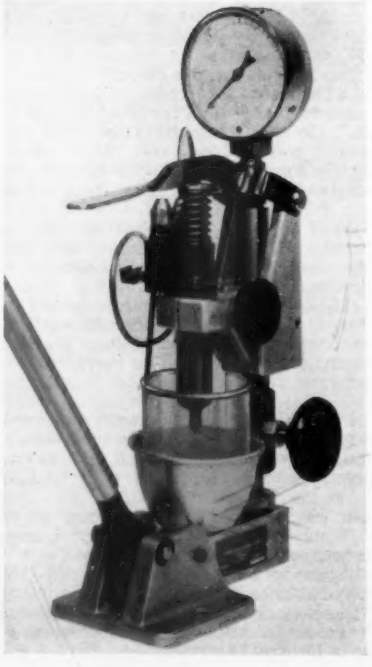
Injector Tester

AN adaption unit has been developed for the Kenpro injector tester, so that it may be used for testing G.M. injectors. This is an extension to the range of the standard tester, which is for A.E.C., B.M.C., Commer, Leyland, Ford, Perkins, and Bedford injectors. Particular attention has been given to designing the unit so that its fitting to the standard assembly is simple and speedily carried out. The unit can be supplied as an optional extra with the standard tester or separately for testers already in use. Further details may be obtained from the Kenpro Manufacturing Co. Ltd., Oakend Way, Gerrards Cross, Bucks.

Electronic Grinding Indicator

THE Morrisflex electronic grinding indicator, hitherto produced by B. O. Morris Limited for exclusive use in Rolls-Royce factories, is now available for general use. The instrument, which is portable, shows when a grinding wheel is in contact with the work when the wheel itself is not visible, because of being inside the work, inaccessible, or obscured by coolant.

A pick-up head, mounted on a magnet, is positioned near the grinding wheel. Vibrations from the wheel produce signals in the pick-up head, which are shown as a "Vee" on a cathode-ray tube in the instrument. Different kinds of "Vee" signal indicate when the wheel makes contact with the work whether the grinding is being carried out too heavily, or whether any eccentricity is present. The apparatus is normally arranged for operation on 200/250-V. single-phase 50-cycle a.c., but supplies at other a.c. voltages can be used through suitable transformer tappings.



Further details can be obtained from B. O. Morris Limited, Morrisflex Works, Briton Road, Coventry.

Portable Welder

THE English Electric LWAD range of portable welding equipment is claimed to be unique in giving either an a.c. or d.c. output at the turn of a switch. Each set has a single-phase oil-immersed transformer designed for connecting across two phases of a 380-440-V. a.c. supply. Silicone diode rectifiers, also oil cooled, are incorporated to produce d.c. with a considerable saving in long-term running and maintenance costs compared with the conventional motor-generator or selenium-plate rectifier welding equipment.

The economies gained by using LWAD equipment probably will be shown to greatest advantage in railway maintenance departments, where the greatest versatility of use with one set is required. The complete absence of moving parts and extreme reliability of performance claimed even under extreme conditions of use and climate, indoor or out, will be distinctly beneficial in tropical and underdeveloped areas overseas.

The heavy-gauge steel oil tank, mounted on three rubber-tyre wheels, contains the transformer, current regulator, rectifiers, smoothing choke, and control switches. A dry compartment is situated at the drawbar end of the set to allow for the installation of a power-factor correction capacitor as an optional extra. Selector switches have simple and positive action with heavy spring loading and liberal rating. The low-loss diode rectifiers will operate satisfactorily at temperatures up to 190°C. No-load losses are very low compared with those of motor-generator sets.

Three sizes are in production. These are the LWAD300, 450, and 600, with maximum continuous hand-welding currents of 250, 350 and 624A. a.c. respectively. The d.c. hand-welding currents are 200, 280, and 520 A. Weights without the capacitors are 1,050, 1,400 and 1,700 lb. respectively.

Further details may be obtained from the English Electric Co. Ltd., Welding Equipment Department, East Lancashire Road, Liverpool, 10.

Profile-Cutting Machine

BISON Mark II profile-cutting machines are designed for use on heavy steel components for locomotives and other large engineering projects. The illustration shows two cutters on a common track being used for profiling heavy side frames for diesel locomotives. Each machine consists of a carriage equipped with a single cutting head, and the installation provides a maximum cutting length of 35 ft. It is capable of profiling mild-steel slabs more than 30 ft. long, 5½ in. thick, and weighing 11 tons each, at a rate of 25 ft. per hr.

Further details may be obtained from the manufacturer, British Oxygen Co. Ltd., Bridgewater House, Cleveland Row, St. James's, London, S.W.1.

Shunting Tractor

THE I.T.W. Tractor illustrated is so designed that, when running without load, the point of balance is just to the rear of the front wheels of the rigid four-wheel drive. When drawbar pull is exerted, the load is transferred to the rear, increasing the tractive effort of the second set of wheels. Power steering is provided by braking on the differential, so that the rear wheels are skid-steered, an arrangement which is claimed to be the most satisfactory on all types of surfaces. There are no foot pedals—all controls are by two hand levers and a very rugged transmission system is incorporated.

There are three speeds forward and reverse. Alternative air-cooled petrol engine or air-cooled diesel engine for 7 h.p. or 8½ h.p. respectively are available. Petrol consumption is about 4 pints an hr., diesel fuel about 2 pints an hr.

The tractor, fitted with fore-and-aft shunting attachments, also can be supplied with built-in power-operated winches, which treble pulling power and allow access to railway wagons in situations where it would be difficult to manoeuvre even a midget machine of this type.

Further details can be obtained from Whitlock Bros. Limited, Great Yeldham, Essex. This company manufactures the equipment under licence from Ransomes, Sims & Jefferies Limited, Ipswich.

Inexpensive Disinfectant

A PINE disinfectant is available at the low ex-works price of 3s. 10d. per gal. in minimum consignments of 40 gal. The manufacturer is willing to tender for bulk quantity requirements. For ease in handling, the 40-gal. consignments are packed in separate 1-gal. containers.

This phenolic disinfectant is ideal for disinfecting drains, sinks, toilets, and hand-basins, and can also be used in solution with detergents.

Consignments can be obtained direct from Durazone-Choice Products, Lovers Walk, Ballards Lane, London, N.3.

Passenger Terminal Opened at Southampton Docks

New facilities by British Transport Docks primarily for P. & O.-Orient Lines

Passengers travelling to and from Australia and New Zealand via Southampton will be among the first to use a new passenger terminal, situated between Nos. 105 and 106 berths in the New Docks, including a reception hall opened by Field Marshal Viscount Slim last Tuesday.

The decision of the P. & O.-Orient Lines to base the new 42,500-ton s.s. *Oriana* and 45,000-ton s.s. *Canberra* at Southampton prompted provision of the new facilities which bring the total number of reception halls at Southampton to eight. This is therefore a further stage in the post-war reconstruction work first marked by completion in 1950 of the ocean terminal for transatlantic liners.

The new terminal, which replaces a small lounge, has its own railway platform at which London boat trains of British Railways, Southern Region, will arrive and depart. The building includes office accommodation and a covered visitors' balcony which is heated and has seats and refreshment facilities. The spacious reception hall occupies most of the ground floor and includes such amenities as a buffet, writing desks, a *bureau de change*, a railway booking office, bookstall, and telephones. Exceptionally comfortable seating is provided throughout the hall and the tasteful decorations include a a 57 ft. long mural, 8 ft. high, spanning the quay-side wall.

Quick Turnround for Liners

At the opening ceremony, attended by about 260 guests, General Sir Brian Robertson, Chairman of the British Transport Commission, welcoming Lord Slim, drew attention to the constantly increasing volume of traffic passing through Southampton which handles about half the ocean-going passenger traffic in this country. He gave an assurance that the B.T.C. would do its best to help the P. & O.-Orient Lines by giving prompt service and quick turn-round facilities at this their new home port.

Lord Slim referred to his own relatively brief term as Deputy Chairman of the former Railway Executive when he found that he had transferred from one great service, the Army, to another where he found the same comradeship and the same pride in service and consideration for duty. It gave him pleasure to regard opening the hall as completing a link in the chain connecting Britain with Australia and New Zealand. He was relieved that there could be no question of visitors, who played a large part in the economy, being subjected to the conditions of a dank cold shed when leaving a luxury liner such as the *Oriana* to form their first impressions of Britain. Their introduction to this country would be a much happier one and they should feel welcome as a result of the amenities of the reception hall. Lord Slim hoped also that the terminal staff would find great satisfaction in doing a really worth-while job for their organisation and for their country. The ceremony was completed by the unveiling of a commemorative plaque which had been draped by the national flags of Australia and New Zealand and surmounted by the Union Jack.

Luncheon on board "Oriana"

There followed a tour of inspection of the terminal, and of the s.s. *Oriana* which was berthed alongside in preparation for its maiden voyage to Australia, New Zealand, and San Francisco on December 5. As the guests of Captain C. Edgecombe and of Sir Donald Anderson, Chairman, Peninsula & Oriental Steam Navigation Co. Ltd., the visitors were entertained to a luncheon on-board.

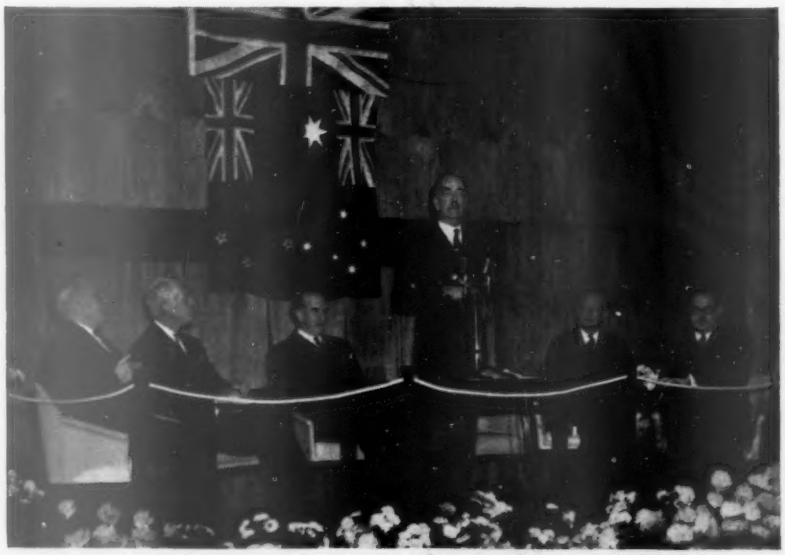
The illustration shows Sir Brian Robertson speaking at the ceremony in the reception hall with, left to right, Sir Robert Letch, General Manager, British Transport Docks, Sir Donald Anderson, Lord Slim, Sir Austin Anderson, Director, P. & O.-Orient Line, and Mr. S. A. Finnis, Chief Docks Manager, Southampton Docks.

Those present also included:—

British Transport Commission :

Sir John Benstead, Deputy Chairman; Messrs. R. F. Hanks and T. H. Summerson, Members; Sir Philip Warter, Chairman of the Southern Area Board; Major-General Ll. Wansborough-Jones, General Secretary; Mr. C. P. Hopkins, General Manager, British Railways, Southern Region.

Sir John Elliot, Chairman, Thos. Cook & Son Ltd.; Sir John M. Brocklebank, Chairman, Cunard Steam-Ship Co. Ltd.; Mr. W. S. Dixon, Chairman, Southampton Harbour Board; Sir Eric Harrison, High Commissioner in the United Kingdom for Australia; Mr. G. R. Laking, High Commissioner for New Zealand; Sir Eric Millbourne, Adviser to the Ministry of Transport on Shipping in Port; Lord Sanderson, Chairman, Shaw Savill Line; Mr. Tarleton Winchester, Vice-President & European General Manager, United States Lines.



Sir Brian Robertson speaking at the opening ceremony at Southampton

Paxman/ALCO Diesel-Engine Manufacturing Agreement

An agreement has been reached between ALCO Products Incorporated (formerly the American Locomotive Company) of New York, and Davey, Paxman & Co. Ltd., Colchester, of the Ruston Group, under which the two firms agree to collaborate on diesel engine design and manufacture for world markets.

Under the agreement, Davey, Paxman & Co. Ltd. will have the advantage of the considerable experience of ALCO Products Inc. with diesel engines for locomotives and marine and stationary applications, and will have the right to manufacture and sell ALCO diesel engines outside the United States. ALCO Products Inc., in turn, will have at its disposal the specialised experience of Davey, Paxman & Co. Ltd. in fast-running engines. In this connection ALCO, for example, will have the right to make and sell Paxman engines of Ventura and other types in the United States for oil-well drilling rigs, diesel-electric power packages, and for application in locomotives of sizes which it does not manufacture at present.

By this exchange of complementary engine designs, both firms will have the advantage of improving efficiency at home and abroad.

Lifting Barrier Crossing Installation at Gloucester

Lifting Barriers, the use of which has only recently been authorised in this country, are to be installed by British Railways, Western Region, at Barton Street level crossing, Gloucester. They will be electtrically operated and replace the existing manually worked level-crossing gates.

The new installation will consist of double half-lifting barriers on each side of the crossing, electrically driven, and controlled by the signalman in the adjacent Barton Street Junction Signalbox. They will be interlocked with the railway signals and the red, amber, green road signals in such a way that the railway signals cannot be cleared for the passage of a train until the barriers are horizontal, closing the road. Similarly, the barriers cannot be raised until the railway signals are at danger, nor lowered until the road signals for the crossing are at red.

The signalman will have a barrier control switch panel, mounted on a pedestal, near the signalbox window allowing a clear view of the crossing. To operate, a two-position rotary switch is turned to raise or lower and the depression of a push-button will cause the barrier to move in the required direction. Sequence of operation is such that the nearside barriers are lowered first, followed by the offside as soon as the near-

side barriers have reached the horizontal position. All four are raised together. They take approximately 18 secs. to close the road and 9 secs. to be raised. The control panel is also fitted with indicators, one to show the position of the barriers, and the other to indicate that the relevant road signals are at red.

The barriers are each 29 ft. long and have wooden booms painted in red and white bands 2 ft. wide, with a 1-in. strip of red retro-reflecting material placed lengthwise on the red portions facing on-coming road traffic. Additionally, a retro-reflecting red target is fitted on each barrier to reflect light from vehicle headlamps. Two electric boom lamps are also fitted.

The lifting barriers, to be installed at Barton Street Crossing, were designed by the Western Region Signal Engineer's staff at Reading to comply with Ministry of Transport requirements, and, with the control gear, have been manufactured at the British Railways Reading Signal Works. The equipment is to be installed on December 4.

L.T.E. Programme Machines

A technical meeting was held at the Institution of Electrical Engineers on October 20. Before normal business the President referred to the decision of the Council to provide some form of memorial to the late Mr. T. S. Lascelles. It had been decided that this should take the form of a President's chair, suitably inscribed. This would be presented to the Institution of Electrical Engineers and would always be available for use at meetings of the Institution of Railway Signal Engineers. This was one of a suite of chairs provided in connection with the reconstruction and refurnishing of the I.E.E. building.

After the ordinary business of the meeting had been concluded the President invited Mr. W. Woodhouse to read his paper entitled " Putney Line Programme Machines." Most of the information in this paper was contained in an article in our October 21 issue. At the conclusion of the paper the President asked Mr. R. Dell to open the discussion. Mr. Dell stated that when the L.T.E. introduced programme machines on the Northern line in 1958 they were quite a new feature and to some extent experimental. It was intended that during 1959 no further development should take place but that they should learn as many lessons as they could from the first installation. Mr. Dell stated that he measured the success of an installation by the number of failures. In 1959 there were 17 failures but during 1960 there had been only five failures to date. Of these none was directly attributable to the machines themselves.

Closer Study of Train Running

Mr. Hadaway considered that the introduction of programme machines had occasioned a closer study of the running of a railway than under the former timetable conditions. Formerly timetables were never disputed though they did not necessarily entirely suit a particular layout. The signalman, having learnt the layout, understood this, and applied his own methods for a solution of local difficulties. These methods could be good or bad and decisions made were not necessarily the most beneficial. The application of programme machines had produced the very best conditions of work study and had ensured that from both the operating and signal engineer's point of view the most suitable arrangements had been provided.

Mr. Marshall stated that, as a traffic man, he had been encouraged by the information he had obtained through Mr. Woodhouse's paper. He had been connected with the previous programme machines on the Northern line and now also with the Putney line installation. He considered that these installations could be classified as a success, but not a huge success. Any innovation was bound to receive criticism though constructive criticism is desired. He considered that the allocation panel at Parsons Green was too big and did not give all the information it should do. The traffic staff were required to operate a 100 per cent service but bearing in mind the quality of staff available at the present time consideration should have been given to the person who comes to Parsons Green for the first time. He must be able to read the panel at a glance. At other depots a chalked board was used giving time and sidings and the composition of stock. There were two types of rolling stock in use which required slightly different methods of operation. The panel should indicate whether a train shown under a siding would be coming into or going out of that siding. Messrs. D. S. Jewell, E. A. Rogers, F. J. Post, G. Kent, and J. H. Currey also contributed to the discussion.

Mr. Woodhouse dealt with the points raised by the various speakers. He referred to Mr. Marshall's criticism regarding the siding allocation panel and agreed that more development work was essential. He also stressed the necessity for miniaturisation of components.

Before closing the meeting the President said that they had heard how every section on the railway co-operated in the task of running the trains, from the signal engineer's designs to the actual operation by the traffic staff, and also those responsible for preparing the timetables to fit in with the programme machines.

Railwaymen Holding Civic Office Entertained

Mr. H. A. Short, General Manager, British Railways, North Eastern Region, entertained on November 16 at the Royal Station Hotel, York, five railwaymen of the North Eastern Region who have been elected to Civic Office for the current municipal year. Messrs. T. H. Summerson, Chairman of the North Eastern Area Board; F. C. Margetts, Assistant General Manager (Traffic); A. Dean, Assistant General Manager (Modernisation); and S. J. Judson, Regional Establishment & Staff Officer, were also present.

Since 1955 four Lord Mayors, 16 Mayors, two Sheriffs, three Deputy Lord Mayors, 12 Deputy Mayors, six Chairman of County Councils, and 18 Chairmen of Urban District Councils have been elected from the staff of the North Eastern Region of British Railways.

The accompanying illustration shows, left to right, Mr. S. J. Judson; Councillor W. Prince, Deputy Mayor of Wakefield; Councillor E. Binns, Chairman of Ilkley Urban District Council; Mr. H. A. Short; Alderman W. E. Body, Lord Mayor of the City of Kingston-upon-Hull; Mr. T. H. Summerson; Alderman N. Garrow, Chairman of the Northumberland County Council; Mr. A. Dean, Councillor A. Handforth, Chairman of the Rothwell Urban District Council; and Mr. F. C. Margetts.

Colour-light Signalling at Plymouth

Introduction of multi-aspect colour-light signalling, on November 26, marks the near completion of one of the major phases in British Railways, Western Region, modernisation of Plymouth. A new signalbox, in which the functions of six existing boxes are concentrated, has been brought into use at the west end of the station.

Signals are colour-light multi-lens units, the majority displaying three aspects. Signalling is controlled from a mosaic-type panel on which the entire layout of the area under control is depicted. A route line-up becomes illuminated in white, changing to red as it becomes progressively occupied by a train. Electric point machines are used for operation of the points. A relay inter-locking system is incorporated in the signal mechanism, and the entire track in the area is fitted with electrically-operated track circuits.

Descriptions of trains entering the signalling area are displayed in code form on a second domino-type panel mounted above and behind the control panel. This shows the layout of the main running lines and junctions, as on the control panel, but the signal profile is replaced by indicator units displaying the description of every train in the section. This description moves from

North Eastern Region employees elected to civic office at the reception at the Royal Station Hotel, York

signal section to signal section as the train moves forward. A standby diesel generator has been installed to take over should the mains power supply fail.

Parliamentary Notes

Plea to Transfer Waterways from B.T.C.

Ten Conservative M.P.s have tabled the following Motion in the House of Commons for discussion when opportunity arises :—

" Nationalised Inland Waterways (Change of Ownership): That this House is of opinion that in implementing their policy set out in the Gracious Speech to reform the structure and functions of the British Transport Commission, H.M. Government should institute legislation to transfer the whole of the nationalised inland waterways system to a National Waterways Conservancy under separate management."

Mr. Humphrey Atkins (Merton & Morden —C.), Mr. Geoffrey Wilson (Truro—C.), Mr. Nigel Fisher (Surbiton—C.), Mr. R. Gresham Cooke (Twickenham—C.), and Wing-Comm. Grant-Ferris (Nantwich—C.) are the sponsors.

Questions in Parliament

Parking at Railway Stations

Mr. R. Sorensen (Leyton—Lab.) asked the Minister of Transport on November 23, in view of the two-hour limit notified at many official parking places, and of the desirability and practice of motorcar drivers leaving their cars at such parking places near suburban Underground and railway stations for several hours while they are at business in inner London, what consultations he has had with local authorities in order substantially to extend the waiting time allowed at parking places, or to abolish any time limit.

Mr. Ernest Marples, in a written answer: As I informed the hon. Member on January 27, local authorities have been consulted by the London & Home Counties Traffic Advisory Committee. Long-term street parking places for 82 cars have this month been authorised in West Ham, near Stratford Station. A pilot scheme for other long-term street parks is being prepared.

Trains for Coal in South Wales

Mr. L. J. Callaghan (Cardiff S.E.—Lab.) asked the Minister of Transport on November 23 what was the result of the enquiries he made of the Chairman of the British Transport Commission about the provision of an adequate number of coal wagons in South Wales to avoid shortages to consumers.

Mr. E. Marples, in a written answer: I am informed that there is no shortage of mineral wagons in South Wales, and that coal traffic is moving freely. The Commission does not expect any difficulty in moving coal from South Wales during the winter unless there is prolonged bad weather or epidemics amongst the staff.

RAILWAY BENEVOLENT INSTITUTION GRANTS.—At its October meeting the Board of the Railway Benevolent Institution granted annuities to two widows and two members and one child, involving an additional liability of £119 a year. One hundred and thirty-two gratuities were also granted, amounting to £1,286 to meet cases of immediate necessity. Grants made from the casualty fund during the month amounted to £1,119 13s.

JOHN BROWN GERMAN AGREEMENT.—John Brown & Co. Ltd. has announced that its subsidiary company, John Brown (S.E.N.D.) Limited, has concluded an agreement with DEMAG Aktiengesellschaft Duisberg for the manufacture and supply in the United Kingdom of a wide range of iron and steel works plant to DEMAG designs. DEMAG is one of the largest and oldest designers and manufacturers of this type of equipment in Europe. John Brown (S.E.N.D.) Limited, is the organisation in the John Brown Group which undertakes the designing and contracting for engineering products which are new to the John Brown subsidiaries, and co-ordinates the manufacture of these new products amongst its appropriate works.

M.A.N. DIVIDEND.—Maschinenfabrik Augsburg-Nurnberg A.G. is proposing to pay an unchanged dividend for the year ended June 30, 1960. Though turnover was 27 per cent higher than the DM 783 million (some £67 million) recorded in 1958-59, the board was unable to increase the distribution. Forthcoming expenditure on rationalisation development and securing important markets is stated to be making great demands on the company's resources.

NYASALAND RAILWAY PAY INCREASE.—Mr. Arthur Rouse, the arbitrator appointed by the Governor of Nyasaland, Sir Robert Armitage, has announced an award of wage increases ranging from 15 to 25 per cent for African workers on the Nyasaland railways. The increases are to be retrospective to November 9 this year. Mr. Rouse has also ordered the setting up of a council for joint negotiations and the examination of grievances.

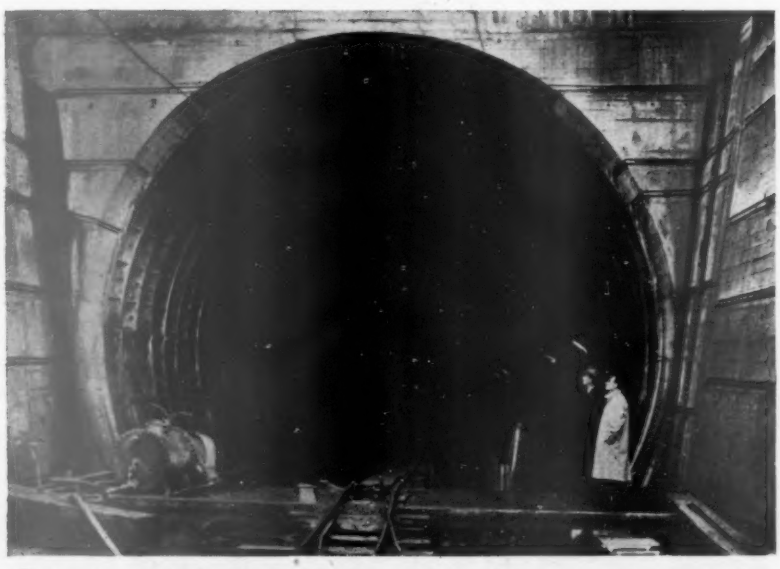
L.T.E. TRAVEL GUIDE POSTER.—A new " How-to-get-there " travel poster specially designed by the London Transport Executive to help amateur soccer fans is going up on Underground stations. It lists 16 leading amateur football clubs in the London area and the bus, Underground and Green Line services which serve them.

NEW COMPANY FORMED BY PERMUTIT CO. LTD.—The Permutit Co. Ltd. (of Great Britain) has announced the formation of a new company, Staperm Limited, for the distribution of Ubatol brand polymer emulsions. This follows the announcement in August of a joint venture for the production and distribution of Ubatol emulsions with the U.B.S. Chemical Company of America, a branch of the A.E. Staley Manufacturing Company of Decatur, Illinois.

DECLINE IN TRANSFORMER ORDERS.—Mr. R. M. Hobill, General Manager of the Transformer Department of Ferranti Limited, told the Restrictive Practices Court last Tuesday that the value of unexecuted orders in his department was equivalent to about one year's work. He was continuing his evidence for the Transformer Manufacturers' Association in support of its price fixing agreement. The court is considering whether the agreement is in the public interest. Mr. Hobill said that in September this year the value of unexecuted orders was £5·6 million. At the same period in 1958 the figure was £6·3 million, which was a healthy condition. "As this falls away I begin to worry in this long-term business," he added.

HALL THERMOTANK LIMITED CAPITAL INCREASE.—Hall Thermotank Limited intends to raise about £700,000 by placing 700,000 7 per cent preference shares with institutional investors. Approval is also being sought for the modification of the rights of the existing 6 per cent preference stock in exchange for which holders are being offered conversion into the new class of 7 per cent preference shares. The financial year which ended on September 30 was a successful one for the United Kingdom members of the Hall Thermotank group. Certain of the Commonwealth and foreign subsidiaries have been experiencing difficulties which will result in some of them showing losses for the year, not all of which will rank for relief against United Kingdom tax. Final figures will not be available to the board until February.

Dartford Tunnel Construction



Kent entrance to the Dartford-Purfleet road tunnel connecting Kent and Essex. Holman pneumatic tools have been used exclusively on this contract

Contracts and Tenders

Diesel-hydraulic locomotives for the German Federal Railway

The German Federal Railway has placed orders for a total of 342 of the standard V.100 Class diesel-hydraulic general purpose locomotive; of this total 322 are to be of 1,100/1,125 b.h.p. and 20 of 1,350 b.h.p. The orders have been divided as follow: MaK, 90; Krupp, 50; Henschel, 55; Krauss-Maffei, 50; K.H.D., 55; Maschf. Esslingen, 12; Arn Jung, 30. Each unit comprises only the superstructure and full erection. The bogies have been ordered separately. K.H.D. is to supply 280, and MaK 67, plus eight spares. All locomotives are to have Voith model L.216rs transmission. Engine orders are: Maybach, 159 of model MD.650 of 1,100 b.h.p.; M.A.N., 20 of model L12V18/21mA of 1,100 b.h.p.; Daimler-Benz 179 of model MB.820B of 1,100 b.h.p. and 20 of model MB.835 of 1,350 b.h.p. These engine orders include spares. The new orders bring the total of V.100 locomotives up to 384.

Steel, Peech & Tozer, of Rotherham, a branch of The United Steel Companies Limited, has secured contracts to the value of £750,000 for the supply of railway axles and wheels to Mexico. Deliveries will be spread over some 10 months and will provide useful work for certain departments which have been short of orders in recent months. These departments include the wheel mill and axle forge at Steel, Peech & Tozer and the machine shops at Owen & Dyson Limited.

The Mitchell Construction Company has been awarded further contracts to the value of £130,000, in connection with the construction of a marshalling yard at Healey Mills, near Wakefield, Yorkshire, for the North Eastern Region of British Railways. The contracts cover the construction of three railway bridges across the River Calder, a road bridge, and ancillary works.

Thomas Smith & Sons (Rodley) Ltd. has received an order from the Admiralty for eight diesel shunting cranes. Four will be of 5-ton capacity, two of 6-ton and two of 10-ton. In addition, the Admiralty has ordered two Smith 10-ton diesel-electric shunting cranes. All 10 machines are for delivery during 1961.

The Atlas Engineering Company has received an order from the Crown Agents for an Atlas standard wheel profile truing machine for the Nigerian Railway Corporation.

The Queensland Government Railways has placed orders for 300 "VJM" Class steel coal hopper bodies for mounting on existing underframes. The order has been divided equally between Commonwealth Engineering Co. Ltd. and English Electric Co. (Australia) Ltd.

The Export Services Branch, Board of Trade, has received calls for tenders as follow :—

From India :

Switching stations and booster transformer stations for railway electrification on the 25 kV., 50-cycle, single-phase system on the Sealdah-Ranaghat and Dum Dum-Bongaon Sections of the Eastern Railway.

The issuing authority is the General Manager & Chief Engineer, Railway Electrification (Ministry of Railways, Government of India). Tender papers containing instructions to tenderers, conditions of tendering, conditions of contract and specifications may be purchased from the office of the General Manager & Chief Engineer, Railway Electrification, 235 Lower Circular Road, Calcutta-20 on and from November 28, 1960, on payment of Rs. 100 per copy. The closing date is February 28, 1961. No further information about this call for tenders is available at the Board of Trade. The Board of Trade reference is ESB/30717/60.

1,200 sets of axles and wheels for steel railway carriages.

The issuing authority is the Government of India, Iron & Steel Control, 33 Netaji Subhas Road, Calcutta-1, India, to whom bids should be sent. The tender No. is DLF/13B/74. Copies of specifications and other documents relating to Indian calls for tender can generally be obtained from the India Store Department, Government Buildings, Bromyard Avenue, Acton, London, W.3. The closing date is January 4, 1961. The Board of Trade reference is ESB/30836/60/DLF.

2 200-h.p. 0-B-0 type diesel shunting locomotives suitable for 5-ft. 6-in. gauge.

The issuing authority is the Director, Central Stores Purchase Department, Government of Andhra Pradesh, Hyderabad-Dn., to whom bids should be sent. The tender No. is 190/MECH–1/60–61. The specifications No. DL–706·60 for these locomotives can be had from the office of the Director-General, Research, Designs & Standards Organisation, Ministry of Railways, Government of India, Ellerslie, Simla-2, Punjab (India), on payment of Rs. 25 exclusive of sales tax for each set. A copy of the conditions of tender only has been received in Export Services Branch. The closing date is December 10, 1960. The Board of Trade reference is ESB/30773/60.

No further information is available at the Board of Trade.

From Pakistan:

3,900 ft. of cable multicore 660V. grade metal-sheathed non-draining oil-impregnated paper-insulated numbered plain annealed-copper conductors waterproofed single wire armoured size 1/·044 12 core. RSC specification No. 1(1947)

8,700 ft. as above but size 1/·044, 20 core.

The issuing authority is the Chief Controller of Stores, E.B. Railway, Pahartali, Chittagong, to whom bids should be sent. The tender No. is P3/HD/150/60. The closing date is December 14, 1960. The Board of Trade reference is ESB/30785/60.

From Formosa:

Numerous items for railway freight wagons construction, including: 160 freight wagon bogies, freight wagon doors, brake riggings, parts and accessories, air brake equipment, couplers, forgings, castings and machined parts, spring and spring riggings, axle and wheel assemblies, and so on.

The issuing authority is the Central Trust of China, Purchasing Department, 68 Yen Ping Nan Road, Taipei, Taiwan, to whom bids should be sent. The tender No. is US-881B. The closing date is December 21, 1960. The Board of Trade reference is ESB/30555/60/I.C.A.

From South Africa:

1 set of resistances for Class 1E locomotives to drawings CEN°A 9/14483, 10/14483, 5/15105 and 43/14483 and specification No. ET-T6A-2/60 (amended October, 1960).

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. K.4679: Resistances," should be addressed to the Chief Stores Superintendent, S.A.R., P.O. Box 8617, Johannesburg. Local representation is essential. The closing date is December 12, 1960. The Board of Trade reference is ESB/30514/60.

From Portuguese East Africa :

65 steel tank wagons with a capacity of 40,000 litres of petrol each.

The issuing authority is the Transport Department, Lourenco Marques, to whom bids should be sent. The tender No. is 1/61. A provisional deposit of Esc. 600,000 must be made by tenderers. Drawings and specifications are obtainable from the Railway Warehouse at Lourenco Marques through the local agents of United Kingdom firms interested. The closing date is February 6, 1961. No further information about this call for tenders is available at the Board of Trade. The Board of Trade reference is ESB/30541/60.

12 electric cranes for the port of Beira.

The issuing authority is the Ports, Railways & Transport Department, Lourenco Marques, to whom bids should be sent. The tender No. is 3/61. A provisional deposit of Esc. 675,000 must be made by tenderers. Drawings and specifications are obtainable from the Railway Warehouse at Lourenco Marques through the local agents of United Kingdom firms interested. The closing date is February 15, 1961. No further information about this call for tenders is available at the Board of Trade. The Board of Trade reference is ESB/30543 60.

From Sudan :

1 floating grab dredger crane for mounting on a hopper vessel.

The issuing authority is the Controller of Stores, Stores Department, Sudan Railways, Khartoum, to whom bids should be sent. The Contract No. is 2222. The closing date is December 29, 1960. The Board of Trade reference is ESB/30497/60.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

CLOSURE OF LINES IN IRELAND.—Because of the projected closure of parts of the Coras Iompair Eireann railway system, the Railway Development Association, a voluntary organisation to foster rail transport, is to sponsor an inquiry into the suitability of the Waterford and Tramore line for a preservation society.

CUMMINS ENGINE CO. INC. EXPANSION.—Cummins Engine Co. Inc., Columbus, Indiana, has announced plans for a $1,700,000 addition to its manufacturing facilities. Construction on the building, which will house all engine assembly functions, is to start immediately. Completion is scheduled for August, 1961. The new facilities will provide 101,600 sq. ft. of additional floor space, increasing the total building area at the Columbus site to over 1,000,000 sq. ft.

Notes and News

Collision in the Western Region.—A British Railways, Western Region, diesel passenger train and a steam-hauled coal train collided at Pontrhydfen, near Port Talbot, South Wales, on November 24. The drivers of both trains were killed and about 30 people were injured.

Level Crossing Accident in Canada.—A Canadian National Railways diesel-hauled freight train collided with a school bus at Lamont, Alberta, last Tuesday. Sixteen children were killed and 16 others injured. The back of the bus was sheared off and carried 100 ft. along the track. Only one child escaped unhurt.

G.E.C. and English Electric Abandon Merger.—The proposed merger between the English Electric Co. Ltd. and the General Electric Co. Ltd., has been abandoned. It would have resulted in the most powerful electrical group in Europe with assets of some £260 million. In a joint statement the two companies have announced that they have been unable to bring their talks to a successful conclusion and negotiations have accordingly been discontinued.

Landslip Delays Trains.—Trains from Colchester, Ipswich, and Clacton, British Railways, Eastern Region, were delayed into Liverpool Street Station on November 28, because of a landslip between Colchester and Parsons Heath. The landslip was 100 yd long, and parts of the track subsided to a depth of 18 in.

Tilbury-Gravesend Ferry Service Arrangements for Christmas Period, 1960.—British Railways, Eastern Region, has announced that during the Christmas holiday period, the following services will be provided on the Tilbury-Gravesend Ferry:—On December 25-26 a 20-min. interval service will operate on the vehicular ferry only, and on December 27 a 20-min. service will be provided on the vehicular ferry. The passenger ferry will operate on a 30-min. interval basis between 6 a.m. and 4 p.m.; a 15-min. service will be provided thereafter until midnight.

Christmas Sailing Tickets to Ireland.—London Midland Region, British Railways, has announced that all sailing tickets have been issued for the 3.25 a.m., 5.20 a.m. and 7.45 a.m. sailings from Holyhead to Dublin on December 23 and 24, and for the 3.25 a.m. steamer on December 22, and the 3 p.m. sailing from Holyhead on December 23. Accommodation is still available on the 5.20 a.m., 7.45 a.m. and 3 p.m. steamers on December 22. The 8.40 p.m. sailing from Dun Laoghaire to Holyhead on December 27 is also fully booked.

Last Stage in Doncaster Traffic Organisation.—The final stage in the task of accommodating all staff of the Traffic Manager, Doncaster, British Railways, Eastern Region, under one roof was recently completed when the Control Office and Movements Sections were installed in Gresley House, the new office block adjoining Doncaster Station.

The Railway Correspondence & Travel Society Organisation. — Following the appointment of Mr. A. R. Brown, at present Hon. Publicity Officer of the Society, as Hon. Chief Editor of *The Railway Observer*, the appointment of Hon. Publicity Officer is to be taken by Mr. J. A. Stone, 77, Upland Road, Sutton, Surrey. This change will take effect on December 5, from which date all correspondence on publicity matters and advertising should be sent to Mr. Stone.

Refreshment Services on London Midland Trains.—Light refreshments, served from a narrow trolley specially constructed to manoeuvre in the corridors of express trains, are being made available on 53 London Midland Region services. Whenever possible restaurant car facilities are included on long-distance trains, but there are still many expresses where the provision of full restaurant or buffet car service could not be justified and the trolley service is an attempt to meet a possible demand for light refreshments. Trolleys have been used with success during the summer, and it is this which has encouraged the London Midland Region to continue with them during the winter services.

London Midland Region Station Closures.—London Midland Region, British Railways, has announced that Kenyon Junction and Ellenbrook (for Boothstown) stations will be closed on January 2, 1961. Kenyon Junction, between Manchester Exchange and Earlestown, will be closed for passenger, parcels, and freight traffic except coal. Passengers should book to Culcheth, Leigh or Newton-le-Willows according to direction of travel. The area is served by buses of Leigh Corporation Transport and Lancashire United Transport Limited. Parcels traffic will be dealt with at Culcheth. Freight, except coal which will continue to be handled at Kenyon Junction, will be dealt with at Warrington or Leigh. Ellenbrook (for Boothstown), between Manchester Exchange and Tyldesley, will be closed for passenger and parcels traffic. Passengers should book to Worsley, Tyldesley or Walkden (High Level) according to direction of travel. The area is served by buses operated jointly by Lancashire United Transport Limited and Leigh Corporation. Parcels traffic will be dealt with at Bolton.

Road Bridge Repairs Cause Cancellations on Southern Region.—The road bridge over the British Railways, Southern Region, railway track near the junction of Aspinall Road and Drakewell Road at Brockley, South London, was found to be unsound and repairs were carried out early this week. As a result trains between the Bexleyheath-Dartford loop and Blackfriars-Holborn viaduct were cancelled and diverted from 7.10 p.m., November 28 to 7.30 a.m., November 30.

Alterations to Pullman Services.—London Midland Region, British Railways, has announced that the Pullman express service between Manchester Central and London St. Pancras will not operate on December 22, 23, or 26. In response to demand in the north west of England "The Midland Pullman" will have an earlier departure from Manchester in the New Year, commencing January 2, leaving Manchester Central at 7.45 a.m., and arriving at St. Pancras at 11 a.m., an hour earlier than at present. The earlier arrival time will enable the service at mid-day to be extended to include Loughborough and Nottingham.

Symposium on Pressure Vessel Research Towards Better Design.—Arising from a suggestion made by the British Welding Research Association, the Institution of Mechanical Engineers is arranging a symposium on "Pressure vessel research towards better design," which will be held at the Institution on January 18 and 19, 1961. The arrangements are being made by a committee appointed by the Council, under the chairmanship of Mr. H. N. Pemberton, Member. The procedure for the presentation and discussion of papers will follow normal Institution procedure, the papers, about 12 in number, being divided into contributions dealing with components and experimental research, and those considering design and design codes. The various papers will include reports on stress analysis investigations, design and testing of various components, pulsating pressure tests, fatigue tests, comparisons of various codes, and probable future design requirements.

Presentation to Monsieur M. de Vos.—The accompanying illustration shows Monsieur M. de Vos, General Manager, Belgian National Railways, receiving the certificate of membership of the Permanent Way Institution from Messrs. L. T. Starks, Hon. Treasurer, and J. A. R. Turner, Hon. Assistant Secretary. Monsieur de Vos had been elected an honorary life fellow of the Institution at its Summer general meeting in Ostend to mark the Institution's indebtedness to the S.N.C.B. for its help in connection with the 1960 Summer convention in Belgium.

Southern Region Train Robbery.—Three mail bags, believed to contain registered packets, were stolen by three masked bandits from the 7 p.m. Ore-Victoria train of British Railways, Southern Region, last Tuesday. The guard, who had been knocked unconscious, was found trussed in his van when the train arrived at East Croydon at 8.46 p.m. The thieves are thought to have boarded the train either at Lewes or Haywards Heath. Confederates were waiting for the train south of Merstham. They then staged a

Monsieur de Vos receiving the Permanent Way Institution certificate of membership from Mr. Starks, centre, and Mr. Turner, left

delaying diversion to stop the train. Railway authorities are investigating the possibility that they interfered with signals. The gang in the train then flung the mailbags out of the window on to the side of the track, and leapt after them.

Cummins Engine Co. Inc. in Australia.—The Cummins Engine Company Inc., of Columbus, Indiana, manufacturer of diesel engines for construction and automotive application, plan to establish manufacturing facilities in the Melbourne area of Australia and assembly of engines is planned by April, 1961.

Installation of Illuminated Display 20 ft. Wide.—British Transport Advertising has installed a new 20 ft. wide illuminated advertising site at Piccadilly Circus Underground station. The site which stands at the top of the escalator to the Piccadilly Line, is half-moon in shape and 13 ft. high at the centre. It is surrounded by a 6 in. teak frame and fitted with a 12 in. deep pelmet concealing a row of fluorescent lights.

Holman Group in Spain.—A factory for Holman-Iberica S.A. has been opened at Pinto near Madrid. Holman-Iberica was formed in 1957 by the Group Holman with its Spanish agents, Maclaurin Morrison y Cia S.A., and that company's associates the Siberex Group.

English Steel Corporation Limited Development at Sheffield.—On November 28 work started on the further development of English Steel Corporation Limited, Tinsley Park site at Sheffield, where 100-ton electric melting furnaces and blooming, billet and bar mills are to be provided by 1963. The contract for earthmoving has been placed with John Mowlem & Co. Ltd. in association with Shellabear Price Limited. About 3,000,000 cubic yards of earth have to be moved and consolidated into terraces on which the proposed steelworks buildings will be erected. The contractors will also demolish existing buildings and prepare the ground for the laying of railway tracks. The whole site was surveyed by B.K.S. Air Surveys Limited and contour maps to a scale of 1/500 with contour intervals of one foot were prepared. These revealed a difference in levels across the site of more than 100 ft. The earthworks have been minimised and, at the same time, a gradient better than 1/90 for the rail tracks has been maintained. It will be necessary for the rail track to loop round about three-quarters of the site. Consulting engineers are W. S. Atkins & Partners, London.

Dowty-Rotol Turbochargers at Smithfield Show.—The Industrial Division of Dowty-Rotol Limited, is displaying a range of turbochargers for diesel-engine tractors (up to 100 h.p.) and stationary diesels for pumping and electrical generators (from 100 h.p. upward) at Stand No. 299, Smithfield Show, Earls Court, London, December 5-9, 1960.

The Railway Club Annual Dinner.—Some 80 members and guests were present at the annual dinner of the Railway Club, held at the Danish Club, Knightsbridge, London, S.W.1, on Saturday, November 26. The Chair was taken by the President, Mr. D. S. M. Barrie, supported by the Vice-Presidents, Messrs. Charles E. Lee, H. A. Vallance, and T. B. Sands. Mr. A. R. Dunbar, Manpower Adviser to the B.T.C., was the principal guest of the club. Other railway officers present as guests were Messrs. E. Anstey, Chief Officer (Films), B.T.C.; L. C. Johnson, Archivist (Historical Records), B.T.C.; C. J. Rider, Public Relations & Publicity Officer, Western Region; R. M. Robbins, Chief Commercial & Public Relations Officer, London Transport Executive; W. J. A. Sykes, Chief Mechanical & Electrical Engineer, Southern Region, and W. G. Thorpe, Line Traffic Manager (Great Eastern), Eastern Region. In replying to the toast of "The Railway Club," proposed by Mr. G. F. Davies, the President recalled the work done for the club by his predecessor, the late Mr. T. S. Lascelles, whose sudden and untimely death earlier in the year had come as a great shock to members. The toast of "Our Guests" was given by Mr. M. D. Greville. In response, Mr. Dunbar emphasised the importance of the rejuvenation of British Railways, and said that perhaps this was receiving less attention than it deserved, because it was team work, and not associated with one outstanding personality. He expressed appreciation of the value of informed public interest, as exemplified by members of the Railway Club.

Dowty Hydraulic Units at Smithfield Show.—Dowty Hydraulic Units Limited, a member of the Dowty Group is exhibiting a selection of products at the Smithfield Show, Earls Court, London, December 5-9.

International Plastics Exhibition.—During June 16-25, 1961, Europlastica will organise in Ghent an International Plastics Exhibition in close collaboration with the Plastics Section of the Belgian Federation of Chemical Industries, the Plastics Section of the Federation of Manufacturers of the Metal Goods Industry (Fabrimetal) and of the Belgian Plastics Syndicate. The exhibition will be held under the patronage of the Belgian Government. Further information can be obtained from the Europlastica Secretariate, Palais des Floralies, Ghent, Belgium. The U.K. agent is Mr. Neven DuMont, 123, Pall Mall, London, S.W.1; telephone: Whi. 8211.

B.T.C. Shipping & International Services Training Conference.—A two-weeks training conference for staff of the British Transport Commission's Shipping and International Services was held recently at the Commission's School of Transport at New Lodge, Windsor. It was the first of its kind and was intended to give staff in the middle levels of the organisation a general background to the shipping and international activities of the B.T.C. The 22 members of the course were selected from the shipping and international services of the regions of British Railways, the

Eastern Region Publicity

Posters produced by British Railways, Eastern Region, in connection with the opening of the North-East London electrification

subsidiary shipping companies of the Commission, and B.T.C. headquarters. Among them were sea-going officers, assistants to divisional managers, headquarters assistants, and continental agents. The conference was opened by Mr. J. L. Harrington, Chief Shipping & International Services Officer, B.T.C. Talks were given on ship design, revenue and expenditure, public relations and publicity, personnel, cargo handling, commercial and customs procedures, the place of B.T.C. services in European transport, and problems arising from special kinds of traffic. A similar conference may be held in the future.

Powder Metallurgy Joint Group Meeting.—The winter meeting of the Powder Metallurgy Joint Group of The Iron & Steel Institute and The Institute of Metals will be held at Church House, Great Smith Street, London, S.W.1, on December 15 at 2.30 to 5 p.m., and December 16 at 9.30 a.m. to 12.30 p.m. and 2 to 5 p.m. The papers to be presented and discussed are on "Sintered Stainless Steel" and "The Practical Aspects of Pressing Metal Powders" (a symposium based on 13 papers). Copies of "Powder Metallurgy," Nos. 5 and 6, containing the papers, may be obtained for 12s. 6d. each from The Secretary, Powder Metallurgy Joint Group, 17 Belgrave Square, London, S.W.1. Visitors will be welcome to attend the meetings; tickets are not required.

Forthcoming Meetings

December 2 (*Fri.*).—The Railway Club, at Royal Scottish Corporation, at 7 p.m. "The Great Central Railway," Mr. Woodruffe-Peacock.

December 2 (*Fri.*).—The Institute of Transport, South Western Section, at Imperial Hotel, Exeter, at 12.30 p.m. Annual Luncheon and Visit of President.

December 2 (*Fri.*).—The Railway & Canal Historical Society, East Midlands Group. "The Stamford Canal," Mr. J. M. Palmer.

December 3 (*Sat.*).—The Historical Model Railway Society at Euston Hotel. Annual General Meeting, and Tenth Anniversary Dinner.

December 5 (*Mon.*).—The Institute of Transport, Metropolitan Section, at 80, Portland Place, London, W.1, at 5.30 p.m. "The Future of Urban Transport," Mr. D. L. Munby. Also visit of President.

December 5 (*Mon.*).—The Institute of Transport, East Anglia Section, at the offices of the Eastern Counties Omnibus Co. Ltd., Norwich, at 6 p.m. "How Much Art in Advertising," Mr. H. D. Muirhead.

December 6 (*Tue.*).—The Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m. "Rheostatic Braking Applied to Multiple-Unit Trains," Mr. J. H. Cansdale.

December 6 (*Tue.*).—The Institute of Transport, Edinburgh 8. Discussion Group, at 23, Waterloo Place, Edinburgh, at 5.30 p.m. "Transport and the Scottish Tourist Industry," Mr. W. A. Nicholson.

December 6 (*Tue.*).—The Institute of Transport, Midland Section, at the Engineering Centre, Birmingham, at 6.30 p.m. "The Channel Tunnel," Mr. M. A. Cameron.

December 6 (*Tue.*).—The Institute of Transport, North Staffordshire Group, at the Grand Hotel, Hanley, at 6.30 p.m. "The Economic Aspect of Transport," Mr. R. L. Smythe.

December 6 (*Tue.*).—Institute of Traffic Administration, Portsmouth Section, at the Solent Hotel, Southsea, at 7 p.m. Annual general meeting.

December 7 (*Wed.*).—The Institution of Railway Signal Engineers, at the Institution of Electrical Engineers, Savoy Place, London, W.C.2, at 6 p.m. "Modern Designs of Signalling Relays," Mr. J. P. Coley.

December 7 (*Wed.*).—The Newcomen Society, at the Science Museum, South Kensington, London, at 5.30 p.m. "The Horse as a Source of Rotary Power," Mr. F. Atkinson.

December 7 (*Wed.*).—The Engineers' Guild Limited, at Grosvenor House, London, W.1, at 5.45 p.m. Annual general meeting.

December 8 (*Thu.*).—British Railways, London Midland Region Lecture & Debating Society, East Lancashire Division, at Manchester. Debate—"Devolution of Authority on the Railways has been carried too far."

December 8 (*Thu.*).—British Railways, London Midland Region, Lecture & Debating Society, at Friends' House, Euston, London, N.W.1. "Have all the Important Decisions of Railway Management been wise?" Mr. A. J. Pearson.

December 9 (*Fri.*).—The Institute of Transport, Swindon Group, at the Engineering Society Rooms, Emlyn Square, Swindon, at 7.15 p.m. "Railway Store Keeping," Mr. J. Dent.

December 10 (*Sat.*).—The Permanent Way Institution, Nottingham & Derby Section, at the Co-operative House, Nottingham, at 3.30 p.m. "The Development of Modern Tamping Methods," Mr. A. Shaw.

Railway Stock Market

Stock markets have suffered a sharp fall owing to uncertainty as to steps the U.S. may take to keep the dollar strong. It is generally assumed that there will be no special measures to slow down trade with Europe, but that action by the central banks and the International Monetary Fund may be decided upon to give the dollar renewed strength. While uncertainty of this kind persists, it is bound to be reflected in stock markets. At home, the Chancellor's lastest remarks have been taken as indicating that he will not ease the credit squeeze in the near future.

Best feature in foreign rails was provided by Antofagasta ordinary stock, which strengthened afresh from 16 to 16½ in response to the resumption of dividends with a 2 per cent payment. The preference stock gained a point at 34½, and the 4 per cent perpetual debentures were quoted at 49½.

Paraguay Central prior debentures have changed hands around 13, and Guayaquil & Quito assented bonds were 59½. Mexican Central "A" bearer debentures strengthened to 60½.

Chilean Northern first debentures held their recent improvement to 53½. Costa Rica ordinary stock was again 35½ with the first debentures 95½. United of Havana second income stock was 6 and San Paulo Railway 3s. units again quoted at 1s.

Canadian Pacifics, reflecting Wall Street, went back from $38⅜ to $37, while the preference stock eased from 59¾ to 59 and the 4 per cent debentures from 61⅞ to 61½. White Pass shares at $10½, compared with $10¾ a week ago.

Business at 7¼ was again recorded in Midland of Western Australia ordinary stock. Nyasaland Railways shares at 9s. and the 3½ per cent debentures at 40 were both the same as a week ago.

Elsewhere, International of Central America common shares eased from $26 to $25; the preferred was again quoted at $103½.

West of India Portuguese capital stock was 110½ and Barsi Light Railway ordinary stock 17½.

Among shares of locomotive building, engineering and kindred companies, Wagon Repairs 5s. shares at 19s. 6d. held all but 3d. of their recent advance. Gloucester Wagon 10s. shares eased from 10s. 9d. to 10s. 3d. and Beyer Peacock 5s. shares from 6s. 9d. to 6s. 6d. while Charles Roberts 5s. shares came back from 9s. 3d. to 9s. but Birmingham Wagon have firmed up from 29s. 6d. to 30s., and G. D. Peters held their rally to 15s. 7½d. Moreover, Westinghouse Brake shares strengthened from 41s. 1½d. to 41s. 4½d. British Oxygen came back with the general market trend, and were 1s. 3d. down at 25s. 6d. while Tube Investments declined to 73s. 6d. A.E.I. receded on balance from 44s. 6d. to 41s 6d., and both G.E.C. and English Electric were quoted at 31s. 9d. compared with 33s. 9d. a week ago. Crompton Parkinson 5s. shares have been quite well maintained at 11s. 3d.

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